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ABSTRACT

This test, the Silver Drawing Test (SDT), evolved from a belief that the intelligence of children and adults who have poor language skills tends to be underestimated. The aim of the SDT is to provide an instrument for assessing the cognitive skills of individuals who have difficulty understanding others and making themselves understood. There are four goals: (1) to bypass language in evaluating the ability to solve conceptual problems; (2) to provide greater precision in evaluating cognitive strengths or weaknesses that might escape detection on verbal measures; (3) to facilitate the early identification of children or adolescents who may be depressed; and (4) to provide a pre-post instrument for assessing progress or the effectiveness of educational or therapeutic programs. Chapter 1 is an introduction. Chapter 2 presents theories underlying the SDT. Chapter 3 presents guidelines for administering the test and scoring results. Chapter 4 provides examples of scored response drawings. Chapter 5 summarizes studies of reliability and validity. Chapter 6 summarizes studies which used the SDT after the second edition was published. Chapter 7 ties assessment to intervention techniques. Contains 76 references, 26 tables, 42 figures, and 3 appendices: testing materials, normative data, and additional intervention techniques. (JBJ)

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Silver Drawing Test of Cognition and Emotion

Rawley Silver, Ed.D., A.T.R-BC

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Silver Drawing Test
of Cognition and Emotion

Rawley Silver, Ed.D., A.T.R-BC

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Chapter I

Introduction

There are two new chapters in this third edition: one ties assessment to intervention techniques, the other presents outcome studies conducted during the past five years, as well as studies of age, gender, and emotional differences or similarities. Also added is a second set of stimulus drawings and a Self-Image Scale. The theoretical background and statistical analyses have been amplified, and scoring guidelines tightened. There is also a change in the title because "Adjustment" has been misinterpreted by readers in other countries.

The *Silver Drawing Test (SDT)* evolved from a belief that we tend to underestimate the intelligence of children and adults who have poor language skills. To illustrate, Charlie (not his real name) seemed especially bright for an eleven-year old, even though I could not understand what he tried to say. He was among the children in an art class I taught in 1962 when manual communication was forbidden in his school, as in many schools for deaf children during the 1960s. Since my students could not lipread or speak, and I could not sign, we communicated by gesturing and sketching. Charlie was enthusiastic and quick to learn. When pleased, he would kiss his fingers in salute, and he often saluted the art materials and his own artwork. His drawings and paintings (see Figures 1 and 2) were included in an art exhibition, *Shout in Silence: Visual Arts and the Deaf,* circulated by the Smithsonian Institution from 1969 to 1976. Later it was shown in the Kennedy Center for Performing Arts and The Metropolitan Museum of Art which provided its catalogue (Silver, 1976).

Three years later, Charlie and I met again in another art class in another school where he was assigned to a class for slow learners. According to his sister, he "came home wild" and refused to do his homework. Charlie had changed and the change was evident in his drawings (Figures 3 and 4).

I told the school psychologist about his abilities as I saw them. For example, when the art class visited a museum which provided a map of its galleries, Charlie led the way because he could read the map so quickly. He knew the direction to take, even when the map was upside down in my hand as we walked. The psychologist was not persuaded to test his intelligence. He could not be tested, she said, because his language was so very poor.

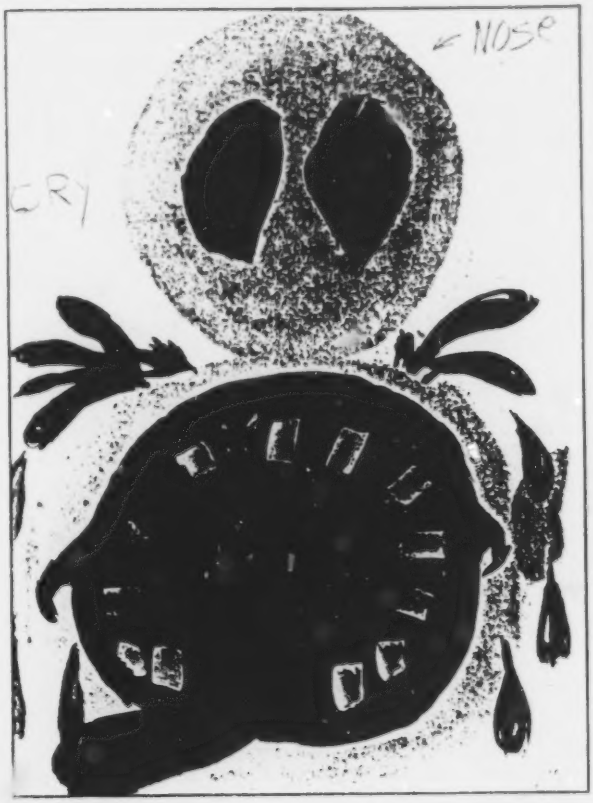
FIGURE 1. *Imaginary landscape by Charlie, age 11.*

FIGURE 2. *"Shout in Silence" drawing by Charlie, age 11.*

11

FIGURE 3. *Imaginary landscape, by Charlie, age 14.*

FIGURE 4. *"Shout in Silence" drawing by Charlie, age 14.*



I wrote for guidance to three prestigious psychologists. One did not reply. Another replied that Charlie should be tested. The third, E. Paul Torrance, sent the nonverbal form of his *Torrance Test of Creative Thinking*, and offered to score the results.

Charlie scored in the upper 0.5% in Originality, the upper 3% in Fluency, the upper 10% in Flexibility, and in the last category, Elaboration, his score was "almost unexcelled" compared with unimpaired children. His performance was "truly outstanding," as Dr. Torrance wrote. It reflected "a high order of ability to acquire information, form relationships, and in general to think."

The school psychologist was not impressed. As she remarked, Charlie's performance "changes nothing because language comes first, and there is a limit to what you can do without language."

What are the limits? If most children use words to solve problems, can children like Charlie use drawings to reach the same solutions? These questions led to reading about cognition, working with other disabled children and adults, and eventually to developing the *SDT*.

The aim of the *SDT* is to provide an instrument for assessing the cognitive skills of individuals who have difficulty understanding others and making themselves understood. There are four goals: to bypass language in in evaluating the ability to solve conceptual problems, to provide greater precision in evaluating cognitive strengths or weaknesses that might escape detection on verbal measures, to facilitate the early identification of children or adolescents who may be depressed, and to provide a pre-post instrument for assessing progress or the effectiveness of educational or therapeutic programs.

Charlie took the *SDT* at the age of 24. Compare his response drawings (Figures 5-7) with responses by the presumably normal adults shown in Figures 13, 17, and 18. After taking the test, he walked in a woodland nearby. The following year, news of an impending hurricane apparently inspired him to drew the damage he imagined the hurricane caused. His drawing, Figure 8, shows that he remembered the spatial relationships between three large trees, and that a young maple grew from the roots of the oak in the foreground.

Organization of the Third Edition

Chapter 2 presents the theories underlying the *SDT*. Chapter 3 presents guidelines for administering the test and scoring results. Chapter 4 provides examples of scored response drawings. Chapter 5 summarizes studies of reliability and validity. Chapter 6, summarizes studies which used the *SDT* after the second edition was published. Chapter 7 ties assessment to intervention techniques.

Appendix A presents the testing materials. Appendix B provides normative data so that individual scores can be compared with average scores. Appendix C includes additional intervention techniques. It should be noted that the names of all who responded to the drawing tasks are fictitious.

FIGURE 5. *Predictive Drawing by Charlie, age 24.*

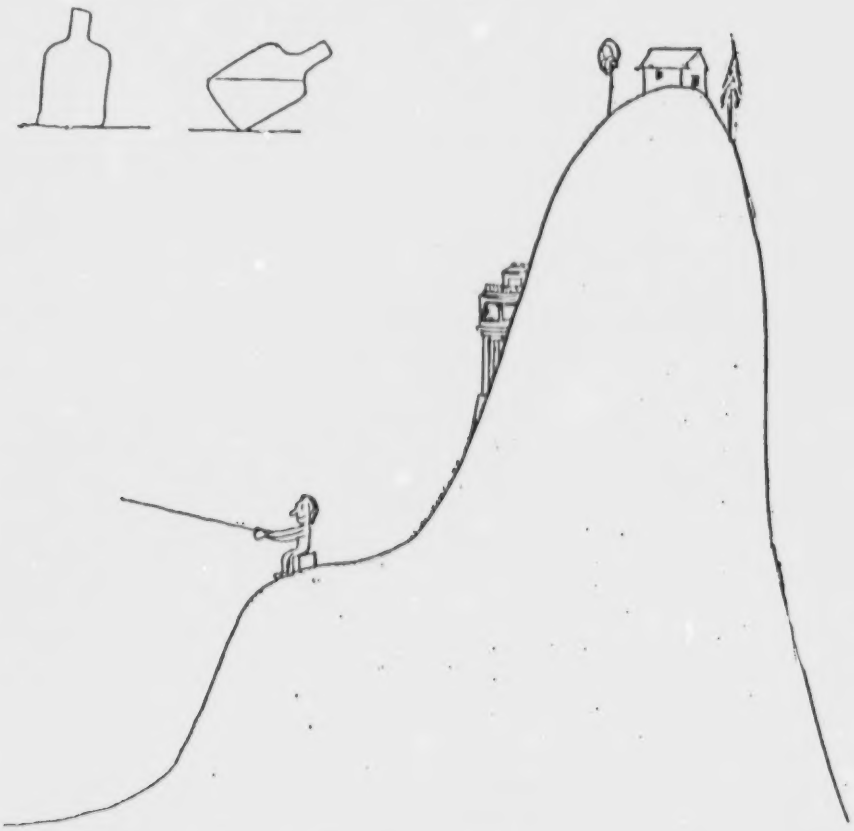


FIGURE 6. *Drawing from Observation by Charlie, age 24*

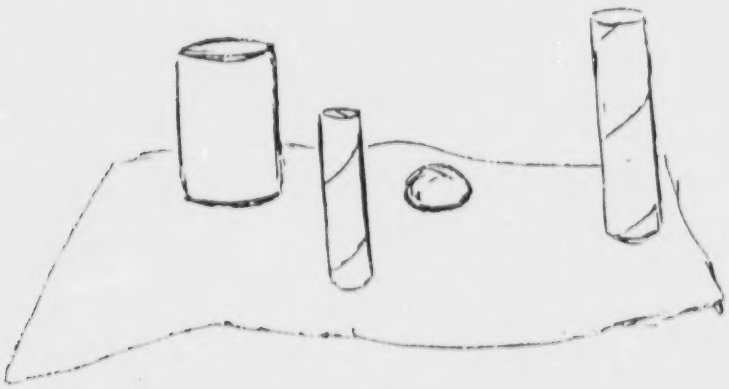


FIGURE 7. *Drawing from Imagination by Charlie, age 24.*

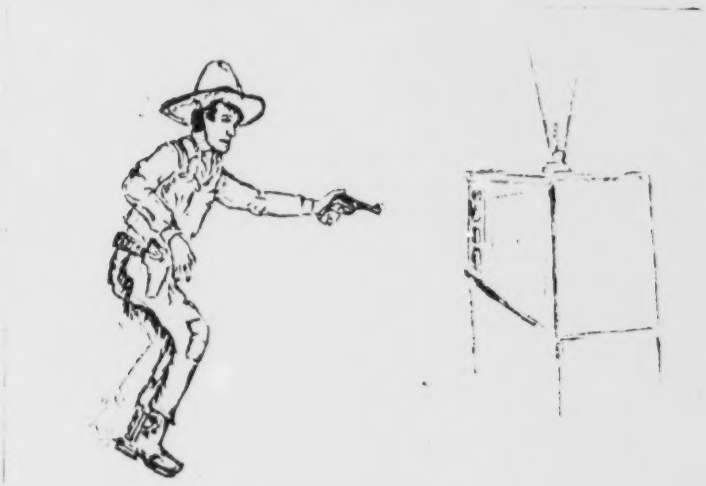


FIGURE 8. *Fantasy of Hurricane Damage by Charlie, age 24.*

Chapter 2

Theoretical Background

The *SDT* evolved from a theory that the intellectual abilities of children like Charlie are often masked by their language deficiencies. It was also theorized that art can be a language of cognition paralleling words, that cognitive skills can be evident in visual as well as verbal conventions, and that these skills, traditionally identified and assessed through words, can also be identified and assessed through drawings.

Some art teachers feel that using art for any purpose other than developing art skills will undermine art education. Some art therapists feel that structuring art experience will inhibit spontaneity and interfere with diagnosis and treatment. It is theorized that art experience can be both therapeutic and structured, and can develop cognitive skills without neglecting art skills.

Jerome Bruner defined cognition as a way of organizing stimuli from the outside world. We carry out thoughts by representing reality vicariously and economically. We represent with the aid of "intellectual prosthetic devices" such as language, but there are pictorial devices as well: "It is still true that a thousand words scarcely exhaust the richness of a single image" (Bruner, 1966, p. 16-19).

The Role of Language in Thinking

Language is obviously related to thinking but whether it is essential is open to question. A recurrent theme in the writings of Piaget (1970) is that logical thinking exists before language is acquired around the middle of the child's second year. Even before acquiring language, children are capable of repeating and generalizing from their actions. If they have learned to pull a blanket to reach a toy, they are capable of pulling the blanket to reach other things, or pulling a string to reach what is attached. Other psychologists suggest that language and thought develop independently, that language follows rather than precedes logical thinking, and even though language expands and facilitates thought, that high-level thinking can and does proceed without it (Arnheim, 1969; Torrance, 1980, Sinclair-de-Zwart, 1969).

If so, the usual assumption of causal relationships may be reversed. It is usually assumed that improving the language skills of hearing-impaired children will improve their thinking, but higher levels of thinking may be the cause as well as the consequence of improved language skills, and nonverbal procedures may cause levels of language to rise.

In the thinking of hearing children, language serves to pin down perceptions, organize experiences, and exercise some control over their worlds (Strauss & Kephart, 1955). By labeling perceptions with words, children can use them again and again, and when frustrated, can substitute words for the wished-for activity and by symbolizing, obtain it in imagination.

Can drawings serve the same functions? Like language symbols, art symbols can label experiences and represent particular subjects or classes of subjects. The painting of a man, for example, can represent the painter's father, authority figures in general, humanity in the abstract, or all three, depending on the verbal context. Children with inadequate language are handicapped in representing their thoughts effectively, but even though their capacities for language are impaired, their ability to symbolize may be intact, enabling them to represent their thoughts by drawing them.

The Role of Images in Thinking

Images have played an important role in scientific discoveries, such as Walton's discovery of the structure of DNA in visualizing a helix, or Kekule's discovery of the benzine ring while visualizing the movements of atoms as a snake grabbing its tail. Witkin and his associates (1962) suggest that styles of thinking are related to individual patterns of adaptation. Preferred modes of thinking are established early in life, and for some, imagery is the preferred mode.

Arnheim (1969) described two styles of estimating time. For example, if it is now 3:40 p.m, what time will it be in half an hour? One person uses arithmetic to find the answer (40 + 30 =70; 70 - 60 = 10). Another visualizes the face of a clock, its minute hand advancing halfway, from the 8 to the 2.

For children or adults who have difficulty putting thoughts into words or understanding what is said, visual thinking is, or could become, more than a matter of preference. It is theorized that these respondents would perform well on tests that call for visual thinking, poorly on language-oriented tests of intelligence or achievement.

Tests that Use Drawings to Assess Cognition

Drawings have been used to assess intelligence for over 50 years. *The Bender Visual-Motor Gestalt Test* (1938) measures visual-motor perception and emotional disturbance by asking examinees to copy abstract designs. *The Draw a Man Test* (Goodenough-Harris, 1963) measures intellectual maturity by requesting drawings of a man, a woman, and a self-portrait. *The Human Figure Drawing Test* (Koppitz, 1968) is scored for level of intellectual development as well as emotional indicators. The Figural Form of *The Torrance Test of Creative Thinking*, (1984) measures fluency, flexibility, originality, and elaboration. These tests are valuable instruments but they are not designed for assessing ability to solve conceptual problems graphically.

The SDT Instrument

In the *SDT*, drawing takes the place of language as the primary channel for receiving and expressing ideas. Stimulus drawings prompt response drawings that solve problems and represent concepts. Responses are scored on rating scales that range from 0 to 5 points, with 5 the highest score.

The *SDT* includes three subtests: Predictive Drawing, Drawing from Observation, and Drawing from Imagination. It has two components: cognitive and emotional.

The Cognitive Component

The cognitive component is concerned primarily with three concepts said to be fundamental in reading and mathematics (Piaget (1970). The first concept is based on ideas of space and applies to neighborhoods and frames of reference; the second is based on ideas of sequential order and applies to relationships, the third is based on the idea of a group and applies to class inclusion. Although these concepts may seem highly abstract, Piaget observed them in primitive forms in the thinking of children as young as six.

Bannatyne (1971) seems to have arrived at the same three concepts after examining performances by dyslexic children on the *Wechsler Intelligence Scale for Children (WISC)*. He noted that they performed well on *WISC* subtests involving spatial ability, moderately well on subtests of conceptual ability, and poorly on

subtests of sequential ability. Rugel (1974) and Smith and his associates (1977) also found that disabled readers scored highest in the Spatial category and lowest in the Sequential category. As Bannatyne observed, learning disabled children have intellectual abilities of a visual-spatial nature that are seldom recognized, allowed-for, or trained.

The *SDT* uses a visual-spatial approach to testing these three concepts. Predictive Drawing measures ability to form a sequence and deal with hypothetical situations. Drawing from Observation measures concepts of space. Drawing from Imagination measures conceptual and creative ability as well as the emotional content of response drawings. The test booklet is shown in Appendix A.

Scoring is based in part, on experiments by Piaget and Inhelder (1967) and by Bruner and his associates (1966) who have traced the development of cognition through successive stages by presenting children with various tasks. Although most of their tasks depend on language skills, their observations about stages of development serve as a paradigm for assessing responses through drawings. The scoring guidelines are presented in Chapter 3.

The Predictive Drawing Subtest

The purpose of the Predictive Drawing task is to measure concepts of horizontality, verticality, and sequential order. Examinees are asked to predict changes in the appearance of objects by adding lines to outline drawings, showing the way a soda would look as the glass is emptied gradually, the way water would look in a tilted bottle, and the way a house would look on a steep slope. Responses are scored on a 5-point scale for level of ability to predict and represent horizontality, verticality, and sequential order.

The Concept of Sequential Order

The ability to conserve, to recognize that an object remains the same in spite of transformations in its appearance, is basic in logical thinking. Most rational thought depends on conservation, according to Piaget; and according to Bruner, the ability to recognize equivalence under different guises is a powerful idea, not only in science but also in everyday life. Up to the age of about seven, children are unable to place things in sequential order systematically or to conserve.

To determine whether examinees have acquired the ability to predict and represent a sequence, they are presented with drawings of a soda and six empty glasses, then asked to draw lines on the empty glasses to show how the soda would appear as one gradually drinks it all.

The task is based on the premise that an examinee who responds by drawing a descending series of horizontal lines in the glasses, with no corrections, has acquired the ability to order a sequence systematically (scored 5 points). Erasures and other corrections suggest that the concept has been achieved through trial and error rather than systematically, reflecting a lower level of development. Drawings which do not represent a series of lines suggest that examinees have not acquired the concept of sequential order.

The Concept of Horizontality

The first natural system of reference involves horizontals and verticals, the most stable framework of every-day experience, according to Piaget and Inhelder, (1967, pp 375-418). Adults are so used to thinking in terms of horizontals and verticals that the concept seems self-evident, but children age four or five, when asked to draw water in the bottles, tend to scribble round shapes. Later, they draw lines parallel to the base even when the bottle is tilted. As they grow older, they draw oblique lines which become less oblique and more horizontal until, around the age of nine, they draw horizontal lines immediately.

To determine whether examinees have acquired the ability to conserve by representing horizontality in spite of changes in appearance, they are presented with drawings of an upright and a tilted bottle, then asked to draw lines on the bottles to show how they would appear half-filled with water.

The task is based on the premise that an examinee who draws a horizontal line in the tilted bottle has learned that the surface of water remains horizontal regardless of the tilt of its container (5 points), and that lower levels of ability can be inferred and scored.

The Concept of Verticality

When five-year-olds are asked to draw trees or houses on the outline of a mountain, they tend to draw them inside the outline; later, they draw them

perpendicular to the slope; and not until the age of eight or nine do they tend to draw them upright (Piaget and Inhelder, 1967).

To determine whether examinees have acquired the ability to conserve by representing verticality in spite of changes in appearance, the Predictive Drawing task asks them to draw the way a house would look if moved to a spot on a steep mountain slope (see Appendix A).

The task is based on the premise that examinees who draw vertical houses supported by posts or other structures have acquired the concept of verticality (5 points), and that lower levels of concept development can be inferred and scored.

The Drawing from Observation Subtest

In tracing the development of spatial concepts, Piaget and Inhelder (1967) noted that young children begin by regarding each object in isolation, its various features taken in turn. Gradually they begin to regard objects in relation to objects nearby, linking them into a single system by coordinating different points of view. At the same time, they begin to develop the ideas of straight lines, parallels, and angles. This coordination assumes the conservation of distance - relations of order applied simultaneously to all three dimensions. Eventually, they arrive at a coordinated system embracing objects in three directions - left-right (horizontal relationships), above-below (vertical relationships), and front-back (relationships in depth).

The purpose of this subtest is to to determine whether examinees have acquired the ability to represent spatial relationships in height, width, and depth. In the task, examinees are presented with an arrangement of three cylinders, differing in height and width, and a small stone (see Appendix A), then asked to draw what they see.

The Drawing from Observation task is based on the premise that examinees who represent spatial relationships accurately in three directions, have high levels of spatial ability (scored 5 points), and that lower levels can be inferred and scored.

The Drawing from Imagination Subtest

In the Drawing from Imagination subtest, examinees are shown a set of 15 stimulus drawings of people, animals, and things, asked to choose two subjects,

then combine the chosen subjects into narrative drawings of their own (see Appendix A). They are encouraged to change the stimulus drawings and to add other subjects and ideas. When they finish drawing, they are asked to add titles or stories.

This subtest differs from the other subtests in that there are no correct responses known in advance, and that critical choices and final decisions are made by examinees. In addition, the subtest includes emotional as well as cognitive components. Its purpose is to provide access to cognitive skills, creative skills, fantasies, and attitudes toward self and others.

Ability to Select (the content of a drawing)

According to the linguist, Ramon Jakobson (1964), selecting and combining are the two basic mental operations underlying verbal behavior. The ability to produce language starts with selecting words and combining them into sentences. The ability to comprehend language proceeds in reverse order, starting with combining the words presented, and ending with selecting or decoding. Jakobson describes expressive language disorder as disturbance in ability to combine parts into wholes, whereas receptive language disorder is disturbance in ability to make selections.

Hornsby (in Bruner, 1966) found three levels of ability to select: the lowest level is perceptual, the intermediate level is functional, and the highest level is abstract. In her experiments, she asked children to select objects that were alike in some way, then explain why they were alike. She found that children progress from grouping objects on the basis of perceptual attributes, such as their colors or shapes, to grouping based on function (what objects do, or what can be done to them). She also found that grouping based on perceptual attributes declined steadily from 47% at age six to 20% at age eleven. At the same time, functional groupings increased from 30% at age six to 47% at age eleven. Not until adolescence did they develop true conceptual grouping based on abstract, invisible attributes; in other words, based on the concept of class inclusion.

The Drawing from Imagination task is based on the premise that examinees who select subjects that imply more than is visible, or identify their subjects as members of a class, have selected at the abstract level (5 points), and that lower levels of ability based on perceptual attributes or functional grouping, can also be inferred and scored.

Ability to Combine (the form of a drawing)

According to Piaget and Inhelder (1967), the most rudimentary spatial relationship is based on proximity. Before the age of seven, children typically regard objects in isolation rather than as part of a comprehensive system. Gradually, they begin to consider objects in relation to neighboring objects. The seven-year-old begins to relate objects to an external frame of reference by drawing a line parallel to the bottom of the paper to represent the ground, relating subjects to one another along this line. Eventually, drawings become more coordinated as children become aware of distances and proportions.

The Drawing from Imagination task is based on the premise that examinees who combine the subjects of their drawings with over-all coordination, have high levels of ability (scored 5 points), and that lower levels of ability based on proximity, or along a base line, can also be inferred and scored.

Ability to Represent (creativity)

As stated by Piaget and Inhelder (1967), children can recognize a circle long before they can draw one. To draw a circle, they must be able to conjure up the mental image of a circle while it is out of sight. A child's ability to represent is imitative and passive at first, then intellectually active.

Psychologists studying the nature of creative thinking have found that creative individuals share characteristic patterns of traits, among them, originality, independence, sensitivity to problems, playfulness, and humor - the ability to toy with ideas and concepts (Rogers, 1962, Torrance, 1962). Whereas analytical thinking proceeds inductively or deductively toward a correct, conventional solution, creative thinking proceeds divergently, perceiving relationships in apparently diverse elements. The creative person is often characterized as one who makes unusual leaps in associating experiences which suggests that high levels of ability to select, combine, and represent ideas are fundamental in creative thinking. Torrance (1980) cautioned against trying to separate creativity from intelligence because they interact and overlap. He also observed that many highly creative children were inferior in verbal ability.

These observations were supported by the findings of a demonstration project in art education for hearing-impaired children and adults (Silver, 1967). The aim of the project was assess their aptitudes, interests, and vocational opportunies in

the visual arts and to identify effective methods of teaching art. A group of 54 self-selected, hearing-impaired children and adults attended experimental art classes, some for one term of 14 sessions, others for two terms. Five assessments were undertaken. For example, paintings by 22 hearing and 22 hearing-impaired students, identified only by number and age, were evaluated for originality, expressiveness, and sensitivity by three art educators using a 5-point rating scale. Mean scores of the hearing-impaired children and adults were found slightly higher than the mean scores of their hearing counterparts, mean scores of the adolescents were slightly lower. Other assessments by panels of judges found hearing-impaired children and adults equal or superior to their hearing counterparts.

In addition, the figural form of *the Torrance Test of Creative Thinking* was administered to 12 of the hearing-impaired children and one adult who volunteered to take the test. Eight scored in the 99th percentile. Their average scores placed them in the 99th percentile in both Originality and Elaboration, in the 97th percentile in Fluency, and the 88th percentile in Flexibility. Similar findings are reported elsewhere (Silver, 1977; 1979, 1983).

The Drawing from Imagination task is based on the premise that examinees whose response drawings show originality, expressiveness, and playfulness have high levels of creative ability (scored 5 points), and that lower levels based on imitation and stereotypes can be inferred and scored.

To summarize, the cognitive component is based on the theory that the *SDT* measures ability to select, combine, and represent; ability to conserve and form a sequence, and ability to represent concepts of horizontality, verticality, height, width, and depth.

The Emotional Component

It is also theorized that responses to the Drawing from Imagination task can provide access to fantasies and facilitate the early identification of children or adolescents who may be depressed or emotionally disturbed. To illustrate, Allan seemed to be an average 8th grade student in a public school in an urban low to middle socio-economic neighborhood. As measured by the Iowa Test of Basic Skills, he scored at the 8th grade 7th month level (8.7); on the California Achievement Test, he scored at the 10th grade level. On the *SDT*, he received maximum scores in all three subtests.

In responding to the Drawing from Imagination task, Allan chose the stimulus drawings of a man and a knife, then drew, "Possessed," a series of drawings in which a devil speaks to someone lying in bed, saying, "Come." The person in bed becomes possessed by the devil, then against his will, stabs and kills another subject who calls him "son" (Figure 24). Since his strongly negative fantasy may have reflected a passing mood, he was asked to respond again the following week. His second response was another series of drawings beginning with a bank hold-up - two people are shot, a car drives away, a man is wanted for murder, is caught and hand-cuffed - and ending with the electric chair (Figure 25).

Allan's repeated fantasy about murder suggested that he was preoccupied with emotional problems and prompted a review of his school folder. It indicated that his mother had remarried when he was in the 4th grade. He had difficulty adjusting and his mother felt this explained his poor progress. His progress remained poor. His fourth-grade teacher found him well-behaved but his work "unsatisfactory." His sixth-grade teacher reported that he worked in spurts. His seventh grade teacher conferred with his parents to discuss his study habits.

It is often difficult to recognize that a youth like Allan is handicapped by emotional conflicts, his potentials masked but manifest in his drawings. His classmate, Connie, also an "average" student, drew "the Dying Bride" who stabs herself in the abdomen (Figure 27). Before Connie and Allen responded to the Drawing from Imagination task, they were not recognized as emotionally disturbed.

Clinical Depression

It is theorized that a child or adolescent who responds to the Drawing from Imagination task with a strongly negative theme or fantasy may be at risk for depression. The Beck Inventory (1978) cites feelings of hopelessness, sadness, and thoughts of death. Beck and his associates (1979) cite three cognitive patterns of depression: negative views of one's self, negative views of one's experiences, and negative views of the future.

Pfeffer (1985) distinguishes suicidal from nonsuicidal children by feelings of hopelessness and worthlessness, and the wish to die. As stated by McKnew, Cytrn, and Yahraes (1983), some children mask depression with antisocial behavior, expressing fantasies of violence, explosions, annihilation, and death, with bad outcomes for the principal subjects.

Diagnostic and Statistical Manual of Mental Disorders, III, a publication by American Psychiatric Association widely used by mental health professionals, lists the following among the characteristics of depressive illness: sadness, hopelessness, aggressive behavior, and suicidal thoughts and actions.

Drawings have been examined for attributes typical of depressive illness. Gantt (1990) found that drawings by depressed patients used less space and fewer details than did normal controls. Wadeson (1980) found that drawings by depressed patients showed more empty space, less color, less effort, and either more or less depressive affect.

Using a different approach, the Drawing from Imagination task is not spontaneous but structured and more concerned with content than form. Evaluation is based on the content or meaning of a drawing, rather than on its form, such as spacing, color, or line quality. Although structured, the task is open-ended, offering choices among the subjects offered and freedom in expressing thoughts and fantasies. The *SDT* is less structured than tests which specify what to draw, such as the *House, Tree, Person Test* (Buck, 1948), *Draw Your Family Doing Something* (Burns and Kauffman, 1972), *Draw A Man* (Goodenough-Harris 1963), or *Draw a Whole Person* (Koppitz, 1968).

Emotional Content

The scale for assessing the emotional content of responses to the Drawing from Imagination task, the Projection Scale, is based on the observation that respondents perceive the same stimulus drawings differently, that they select stimulus drawings based on individual past experiences, and that their selections trigger associations and fantasies expressed through drawings and stories.

It is theorized that responses to the Drawing from Imagination task reflect attitudes of the respondents toward themselves and toward others in ways that can be quantified.

The score of 1 point is used to characterize strongly negative themes or fantasies; 2 points, to characterize moderately negative themes, as indicated in the scoring guidelines, Chapter 3. At the high end of the scale, 5 points is used to characterize strongly positive themes; 4 points, moderately positive. The neutral score, 3 points, is used for reponses that are ambivalent, ambiguous, or unemotional. In the present edition, this scale differs from previous scales in that unemotional responses are now included in the 3 point-score (instead of zero) in

order to end the confusions in calculating mean scores of responses to the *SDT* and the *Draw a Story* tests.

Although this scale is a continuum ranging from strongly negative to strongly positive emotional content, it is not a progression from mental illness to mental health and should not be included in total *SDT* scores. When the scale is used as a pre-test and post-test, however, it can provide evidence of change, such as regression or post-intervention progress.

Response drawings have been associated with clinical depression. These were responses to the *Draw A Story* task which resembles the *SDT* Drawing from Imagination task but uses a different set of stimulus drawings.

Relationships between the *Silver Drawing Test* and the *Draw A Story* Test

The *Draw a Story* instrument *(DAS)* (Silver, 1988b/1993) was designed to screen for depression. Its stimulus drawings were selected, in part, from those in the *SDT* because they seemed to prompt negative fantasies. Although the two instruments present the same drawing task and use similar rating scales, they have different sets of stimulus drawings.

Three studies found that responses to the *DAS* task were associated with clinical depression. In the first study, the stimulus drawings were presented to 350 subjects including depressed children, adolescents, and adults; nondepressed children and adolescents; and children who were hearing-impaired, learning-disabled, or emotionally disturbed with nondepressive psychopathology (Silver, 1988a). Results indicated that the proportion of clinically depressed children and adolescents who responded with strongly negative fantasies, scored 1 point, was significantly greater than the proportion of any other group scoring 1 point, at levels ranging between $p < .005$ and .0005. Although strongly negative responses did not necessarily indicate depression, and conversely, strongly positive responses did not exclude depression, the findings suggested that children or adolescents who respond with strongly negative fantasy may be at risk for depression and that referral for thorough mental health evaluation would be appropriate. The findings did not apply to the sample of clinically depressed adults.

A second study involving 107 depressed and nondepressed adolescents and adults found that the depressed men responded with negative themes to a significant degree whereas the depressed women tended to respond with ambiguous or ambivalent themes (Silver, 1993). Female drawings showed significantly fewer

details than male drawings but no significant differences were found between depressed and nondepressed subjects either in the use of detail or the use of space. The tendencies of depressed adolescents were unclear.

The third study (Slack, 1991) involving 11 children of alchoholics found correlations between the *DAS* and the *Children's Problems Checklist* (Schinka, 1990). As the children were rated more depressed as measured by the *DAS*, their parents independently reported the children more distressed and exhibiting more behavior problems as rated by the *Children's Problems Checklist*. On the other hand, no correlations were found betweeen the *SDT* and the *Reynolds Child Depresson Scale*, a self-report measure, or with the *Kinetic-Family-Drawing*(Burns & Kaufman, 1972). Slack suggested that the *DAS* may be uncovering masked depression, a construct which the *Reynolds Scale* does not measure.

Since the *DAS* stimulus drawings had been selected because they seemed to trigger strongly negative fantasies, a reviewer questioned whether it was the negativity of the stimulus drawings that had triggered the negative responses, thus restricting the potential of the *DAS* for identifying depressed respondents. It is theorized that the *DAS* stimulus drawings are no more negative than the *SDT* stimulus drawings, and that both instruments can serve to screen for depression, or masked depression. The study reported on page 102 provides support for this theory.

Identifying and Assessing Self-images

It is usually assumed that discussion is necessary in order to identify self-images in projective drawings because without discussion we are likely to project our own feelings into drawing by others.

To examine the assumption, Silver & Ellison (1995) asked 53 incarcerated adolescents, ages 13 to 18, to discuss their *DAS* responses with an art therapist and specify the subjects in their drawings with whom they indentified. Two art therapists also judged their self-images: the therapist who interviewed them and a therapist who judged their responses blindly. The degrees of agreement between the respondents and the therapists were then analyzed. Of the 53 respondents, 39 identified self-images. The therapist who interviewed them, accurately matched 77% whereas the therapist who judged blindly, matched 72%. Across the 53 respondents, the average interscorer validity index was 74.4% and the interscorer agreement was 94.3%.

These findings suggested that discussion may not be necessary in order to identify self-images. Although discussion is preferable, and the more discussion the more accurate interpretations are likely to be, the findings seem to indicate that discussion can be bypassed in order to facilitate early intervention when circumstances or time limitations make interviews impossible.

It is theorized that the *SDT* Self-Image Scale can be useful in screening children and adults for depression or masked depression.

Identifying and Assessing Age and Gender Differences

Age and gender differences (and similarities) have been found in responses to the *SDT, DAS* and *Stimulus Drawing* instruments. In the latter, significant differences were found between 326 males and females across four age groups of children and adults (Silver, 1987b). Males consistently drew pictures about successful subjects inhabiting dangerous worlds while females related subjects to environments, portraying fortunate subjects in pleasant worlds, unfortunate subjects in unpleasant worlds. Age differences approached but did not achieve significance.

In response to the *DAS* task, age and gender differences have also been found. In the first study (Silver,1993a) involving 203 women and girls, 157 men and boys, both genders expressed more negative than positive attitudes towad the solitary subjects they portrayed. In drawings about relationships, 72% of the males drew assaultive or stressful relationships, 9% drew friendly or caring relationships. Female age groups tended to be both negative (34%) and positive (29%).

In a second study (Silver, in press) involving 64 adolescents in detention and 74 normal controls, significant gender differences were found in both solitary and assaultive content. Greater gender differences were found among the normal adolescents than then delinquent adolescents.

It is theorized that responses to the *SDT*subtests will provide additional information about age and gender differences in cognitive skills as well as attitudes toward self and others. This theory is supported by studies reported in Chapter 6.

Form B Stimulus Drawings

This new set of stimulus drawings, Form B, is intended for use in assessment, development, or as a semi-structured interview technique, by providing another set of stimuli and a second response drawing.

Chapter 3

Administering and Scoring the SDT

Administering

The age range recommended for the *SDT* is from age 5 to adult, although the test has been used effectively with children as young as 3 years 6 months, as shown in Figure 31. There is no time limit. Most examinees take 12 to 15 minutes to complete the three tasks shown in Appendix A.

The test has been administered and scored without preliminary training by teachers, art therapists, psychologists, and other mental health professionals. Individual administration is recommended for children younger than seven, for examinees who may have difficulty understanding directions, and for children or adults who are being examined clinically.

In group administration, it is useful to arrange the Drawing from Observation task before examinees enter the room. Place the cylinders and the stone on their outlines on the layout sheet. The arrangement should be *below* eye level so that the layout sheet will be seen as a plane (if the arrangement is at or above eye level, the layout sheet will be seen as a line, obstructing the perception of depth and lowering performance scores). When testing large groups of examinees, long narrow cafeteria tables can be useful with cylinder arrangement at both ends, and chairs along both sides. Note that the widest cylinder should be visible on the left; the tallest, on the right, and the stone, to the right of the small cylinder. Check viewpoints from the farthest seats before examinees arrive.

Set each place with the test materials and a sharpened pencil with eraser, reserving a copy and a pencil for yourself. Do not encourage or discourage examinees from erasing because erasures can provide useful information and determine scores in the Predictive Drawing subtest.

It is important to establish an atmosphere that is encouraging and supportive. As an introduction, you might say,

I believe you will have fun with this kind of drawing. You will be asked to draw things you can see, things you cannot see, and things only you can imagine. It doesn't matter whether or not you have talent in drawing. What matters most is using your imagination and expressing your own ideas.

After examinees begin responding to the drawing tasks, discourage interruptions and distractions, including your own. Whenever possible, postpone discussions until all have finished drawing.

Predictive Drawing

If examinees have difficulty reading directions, hold up your test booklet, turn the page, point to the first glass on the left and say, "Here is an ice cream soda. Suppose you drank a few sips."

In your booklet, demonstrate by drawing a horizontal line in the second glass near the top, and say,

> Can you draw lines in the glasses to show how the soda would look if you took a few sips, then a few more, and more, until you gradually drank it all?

If an examinee has difficulty understanding, pantomime with a drinking straw, taking care not to make a series of gestures or indicate where lines should be drawn. If you use manual language, modify the directions as needed.

Drawing from Observation

Present each examinee with a copy of the Drawing from Observation page. If they have difficulty reading, pantomime sketching the arrangement on your page (no more than five seconds) and say,

> Have you ever tried to draw something just the way it looks? Here are some things to draw. Look at them carefully, then draw what you see.

Drawing from Imagination

Present examinees with copies of the Form A Stimulus Drawings together with copies of the drawing page. If they have difficulty reading directions, hold up your copy of the stimulus drawings and say,

> Here are some pictures of people, animals, and things. Choose two picture ideas and imagine a story - something happening between the pictures you choose.
>
> When you are ready, draw a picture of what you imagine. Show what is happening in your drawing. You can change the pictures and draw other things too. Make your drawing tell the story.

Use pantomime or manual language as needed. If an examinee traces or copies the stimulus drawings, do not intervene unless you believe that the instructions were misunderstood.

After about 8 minutes, encourage those still drawing to finish quickly. After drawings are finished, ask for the stories. If a respondent has difficulty writing, ask what is happening in the drawing, then write the response verbatim on the lines provided.

Whenever possible, discuss responses individually so that meanings can be clarifed. If the meaning remains unclear, ask questions, such as, "Can you tell me what your subjects are doing?" "What are they thinking?" "How do they feel?" "What may happen later on?" If it seems appropriate, also ask, "If you were in this picture, how do you imagine you would feel?"

Scoring the *SDT*

Scoring time is usually three to six minutes for each test booklet. Record sheets for entering individual and group scores are provided in Appendix A (pages 127 and 128). To compare individual scores with average scores and percentile ranks, see the normative data in Appendix B (pages 129-134).

The scorer is cautioned about combining subtest scores into total scores. Some examinees receive low scores in some cognitive abilities, high scores in others. Consequently, their total scores can mask particular strengths and weaknesses.

The scorer is also cautioned about the self-report requested in response to the Drawing from Imagination task (page 126). We have found that the self-reports are often unreliable and suggest resistance to disclosure. Nevertheless, they provide insight into masked depression, denial, and unconscious feelings, and can be useful when talking with respondents about their drawings.

Scoring the Predictive Drawing Subtest

Predicting a Sequence

0 points: No sequence representing the soda inside the glass or glasses.
1 point: Incomplete sequence.
2 points: Two or more sequences.
3 points: Descending series of lines with corrections (trial and error).
4 points: A sequence with unevenly spaced increments but no corrections.
5 points: A sequence with evenly spaced increments and no corrections (systematic). The sequence does not have to continue to the bottom of the glass.

Predicting Horizontality*

0 points: No line representing water surface is inside the tilted bottle.
1 point: Line parallels bottom or sides of tilted bottle (suggesting that the frame of reference is inside the bottle).
2 points: Line almost parallels bottom or sides of tilted bottle.
3.points: Line is oblique (suggesting that the frame of reference is external but not related to the table surface).
4 points: Line seems related to the table surface but is not parallel.
5 points: Line is parallel to the table surface within 5 degrees.

Predicting Verticality*

0 points: No representation of the house or, if examinee is younger than 5, the house is inside the mountain.
1 point: House is approximately perpendicular to the slope.
2 points: House is neither perpendicular nor vertical but on a slant or upside down.
3 points: House is vertical but has no support (may be entirely inside the mountain if examinee is older than 5 years).
4 points: House is vertical but has inadequate support, such as partly inside the mountain.
5 points: House is vertical, supported by posts, columns, platforms, or other stru- -res.

*The tasks for predicting horizontality and verticality are adapted from experiments by Piaget and Inhelder (1967).

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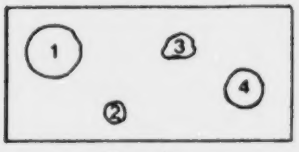
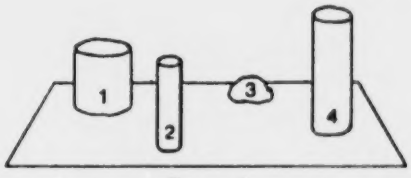
Scoring the Drawing from Observation Subtest

Sketches of the arrangement are shown below. The front view can serve as the criterion for drawings scored 5 points.

When scoring, note that cylinder #1(on the left) should be the widest and #4 (on the right) should be the tallest; cylinder #2 should be in the foreground; andthe stone #3, behind and between #2 and #4. To examinees seated toward the left, #2 will appear farther from #1 and closer to #3. To examinees seated toward the right, #2 will appear farther from #3 and closer to #1.



Top view



Front view

Horizontal (left-right) Relationships

0 points: Horizontal relationships are confused. No objects are in the correct left-right order.

1 point: Only one object is in the correct left-right order.

2 points: Two objects are in the correct left-right order.

3 points: Three adjacent or two pairs of objects are in the correct left-right order.

4 points: All four objects are approximately correct in left-right order but not carefully observed and represented.

5 points: All objects are in the correct left-right order.

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Vertical (above-below) Relationships (Height)

0 points: All objects are flat; no representation of height.

1 point: All objects about the same height.

2 points: Two objects (not necessarily adjacent) are approximately correct in height.

3 points: Three objects (not necessarily adjacent) are approximately correct in height.

4 points: All four objects are approximately correct in height but not carefully observed and represented.

5 points: All vertical relationships are represented accurately.

Front-Back Relationships (Depth)

0 points: All objects are in a horizontal row even though the arrangement was presented below eye level, or else no adjacent objects are correctly related in depth.

1 point: One object is above or below a base line (drawn or implied), or else front-back relationships are incorrect.

2 points: Two objects (not necessarily adjacent) are approximately correct in front-back relationships.

3 points: Three adjacent objects, or two pairs, are approximately correct in front-back relationships.

4.points: All four objects are approximately correct in front-back relationships but not carefully observed and represented.

5 points: All front-back relationships are represented accurately and the layout sheet is included in the drawing.

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Guidelines for Scoring the Drawing from Imagination Subtest

Ability to Select (the content or message of a drawing and/or story)

0 points: No evidence of selecting.

1 point: *Perceptual level*; single subjects or subjects are unrelated in size or placement.

2 points: Subjects may be related in size or placement, but there is no interaction.

3 points: *Functional level;* shows what subjects do or what is done to them; concrete.

4 points: descriptive rather than abstract or imaginative.

5 points: *Conceptual level*; imaginative, well-organized idea, implies more than is visible, or shows ability to deal with abstract ideas. Art skills are not important here.

Ability to Combine (the form of a drawing)

0 points: single subject, no spatial relationships.

1 point: *Proximity*; subjects float in space, related by proximity rather than a baseline.

2 points: attempts to show relationships, such as arrows or dotted lines.

3 points: *Baseline;* subjects are related to one another along a baseline (real or implied).

4 points: Beyond the baseline level, but at least half the drawing area is blank.

5 points: *Overall coordination*; depicts depth or takes into account the entire drawing area, or includes a series of two or more drawings.

Ability to Represent (creativity in form, content, title, or story)

0 points: No evidence of representation.

1 point: *Imitative*; copies stimulus drawings or uses stick figures or stereotypes.

2 points: Beyond imitation, but drawing or ideas are commonplace.

3 points: *Restructured*; changes or elaborates on stimulus drawings or stereotypes.

4 points: Beyond restructuring, moderately original or expressive.

5 points: *Transformational;* highly original, expressive, playful, suggestive, or uses metaphors, puns, jokes, satire, or double meanings.

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Projection Scale for Assessing the Emotional Content of Responses to the Drawing from Imagination Task*

1 point: *Strongly negative themes,* for example,

Solitary subjects portrayed as sad, isolated, helpless, suicidal, dead, or in mortal danger.

Relationships that are destructive, murderous, or life-threatening.

2 points: *Moderately negative themes,* for example,

Solitary subjects portrayed as frightened, angry, dissatisfied, assaultive, destructive, or unfortunate.

Relationships that are stressful, hostile or unpleasant.

3 points: *Neutral themes,* for example,

Ambivalent, both negative and positive,

Unemotional, neither negative nor positive,

Ambiguous or unclear.

4 points: *Moderately positive themes,* for example,

Solitary subjects portrayed as fortunate but passive, enjoying something, or being rescued.

Relationships that are friendly or pleasant.

5 points: *Strongly positive themes,* for example,

Solitary subjects portrayed as effective, happy, or achieving goals.

Relationships that are caring or loving.

---

*The 1995 edition of this rating scale differs from previous editions in that unemotional responses are now scored 3 points, in order to eliminate confusions between mean scores of responses to the *Silver Drawing Test* and the *Draw A Story* instrument.

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Self-Image Scale*

1 point: *Morbid fantasy,* respondent seems to identify with

a subject portrayed as sad, helpless, isolated, suicidal, dead, or in mortal danger.

2 points: *Unpleasant fantasy,* respondent seems to identify with

a subject portrayed as frightened, frustrated, or unfortunate.

3 points: *Ambiguous or ambivalent fantasy,* respondent seems to identify with

a subject portrayed as ambivalent or unemotional, or else

the self-image is unclear or invisible (such as the narrator)

4 points: *Pleasant fantasy,* respondent seems to identify with

a subject portrayed as fortunate but passive, such as being rescued.

5 points: *Wish-fulfilling fantasy,* respondent seems to identify with

a subject who is powerful, loved, destructive, assaultive, or achieving goals.

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*If a respondent seems to identify with more than one subject, enter more than one score.

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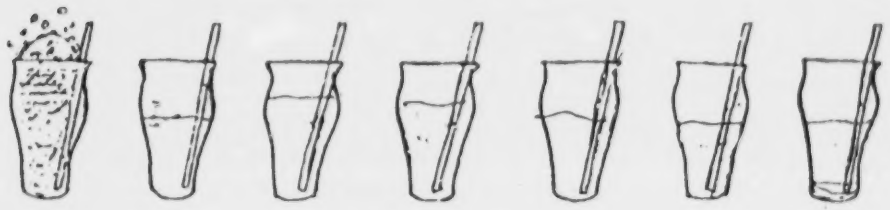
Chapter 4

Examples of Scored Responses

FIGURE 9: ***Predicting a Sequence***

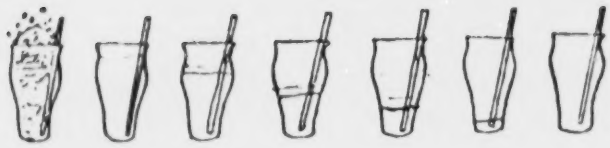


0 points: No sequence representing the soda in the glasses.

1 point: Incomplete sequence.

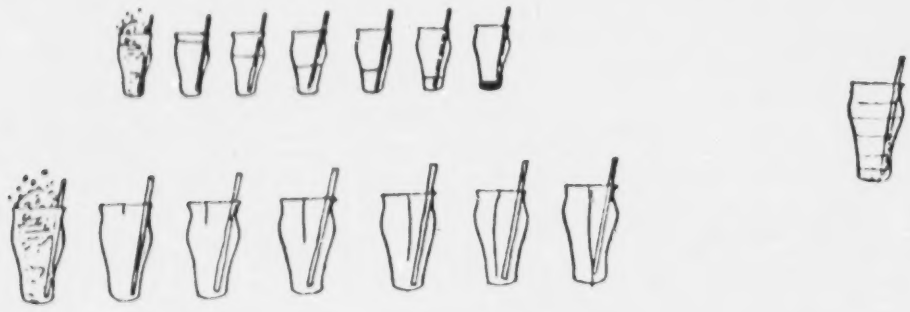
2. points: Two or more sequences.

3. points: Descending series of lines with corrections (trial and error)



3 points: Descending series of lines with corrections.

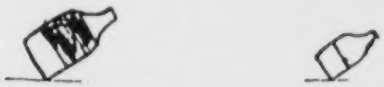
4 points:Sequence with unevenly spaced increments but no corrections.



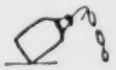
5. Sequence with evenly spaced increments and no corrections (systematic).

FIGURE 10. ***Predicting Horizontality***

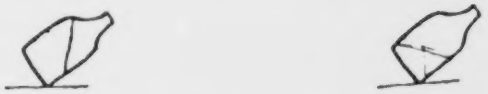
1 point: Line parallels bottom or side of tilted bottle.



2 points: Line almost parallels bottom or sides.



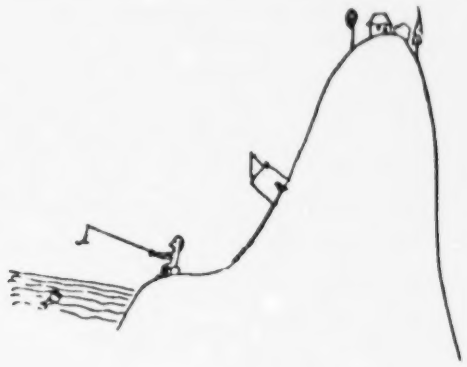
3 points: Line is oblique.



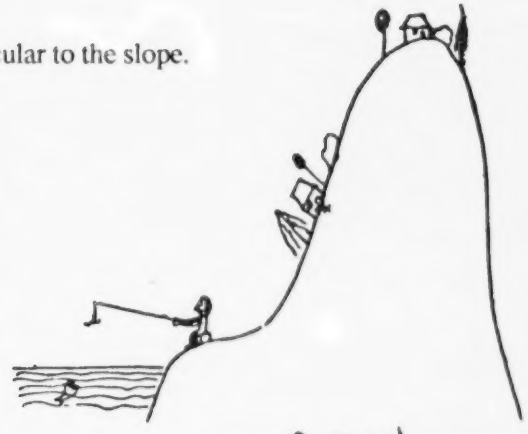
4 points: Line relates to the table surface but is not quite parallel.

5 points: Line is parallel to the table surface within 5 degrees.

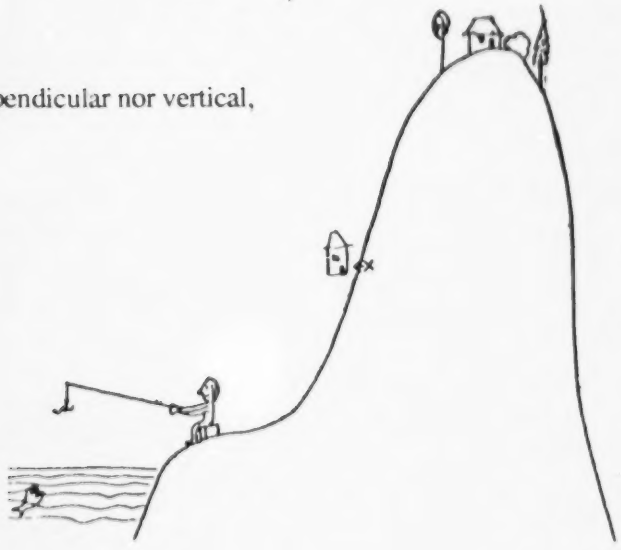
FIGURE 11: ***Predicting Verticality***



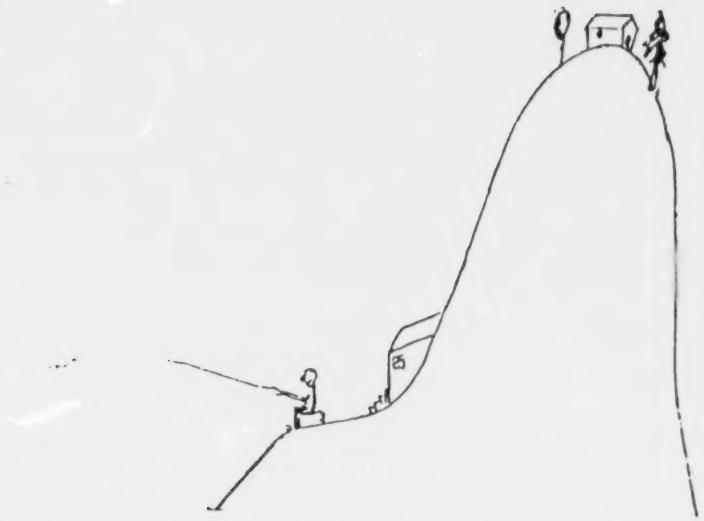
1 point: House is approximately perpendicular to the slope.



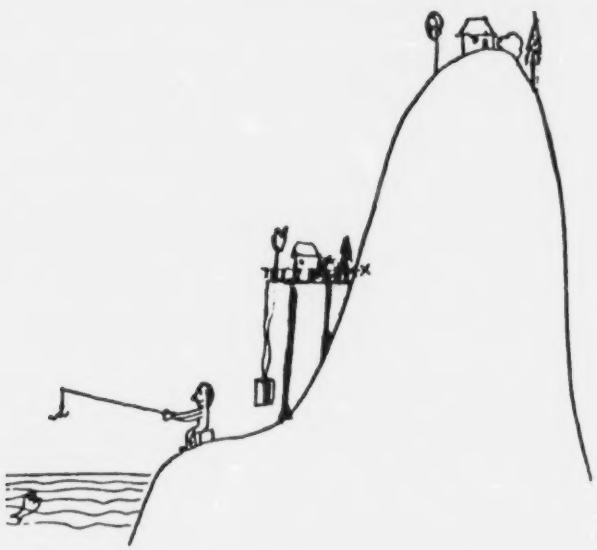
2 points: House is neither perpendicular nor vertical,



3. points: House is approximately vertical but has no support.



4. Points: House is vertical but has inadequate support.



5 points: House is vertical and supported by a platform and posts.

FIGURE 12. *Predictive Drawing by Tania, age 9.*

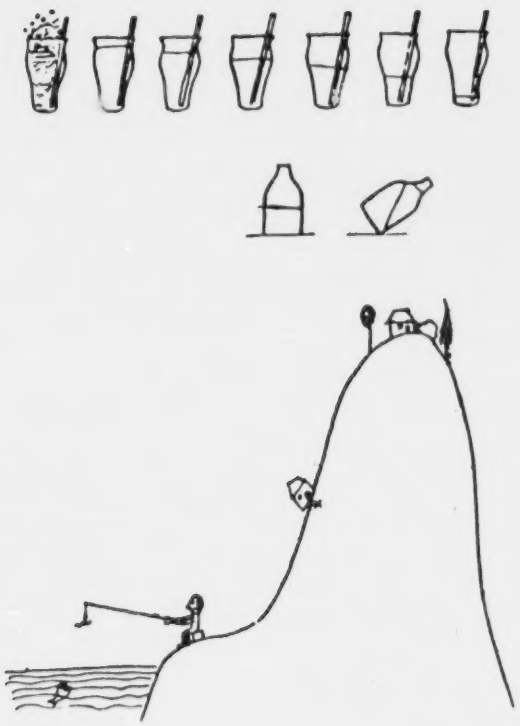


FIGURE 13. ***Predictive Drawing by an Adult in a University Audience.***

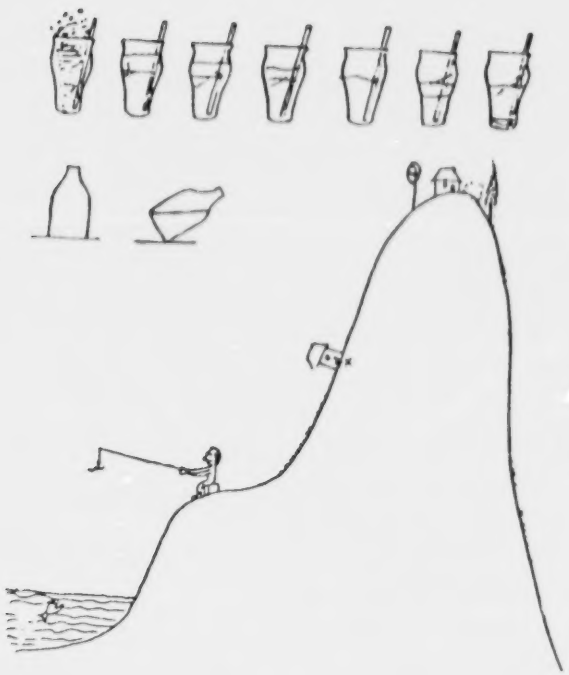
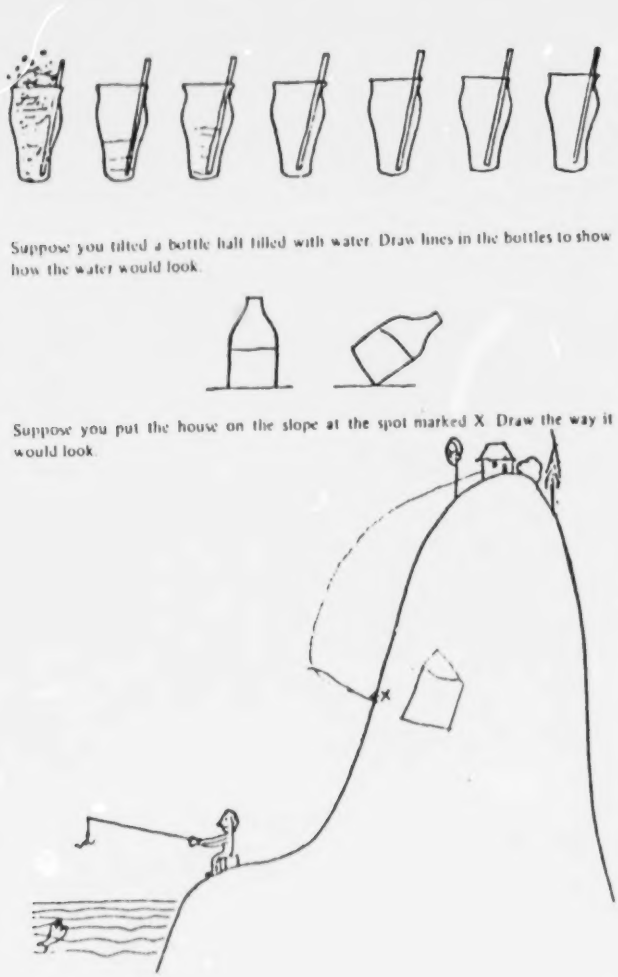


FIGURE 14. ***Predictive Drawing by George, age 13, Expressive and Receptive Language Impairments.***

FIGURE 15. ***Predictive Drawing by Caroline, Age 3 years, 8 months.***

Predicting a Sequence	1
Predicting Horizontality	2
Predicting Verticality	0

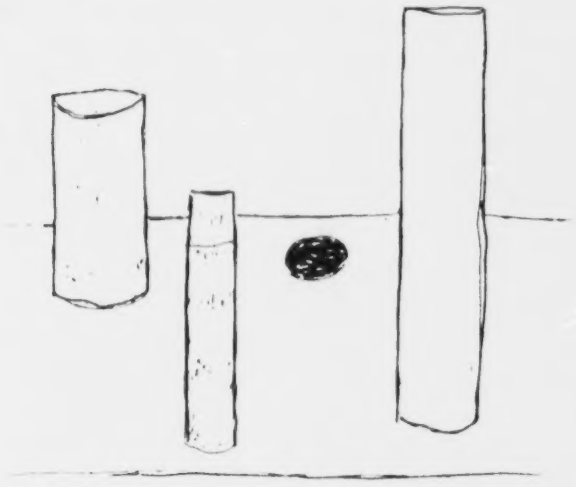

Suppose you tilted a bottle half filled with water. Draw lines in the bottles to show how the water would look.
Suppose you put the house on the slope at the spot marked X. Draw the way it would look.

Drawing from Observation

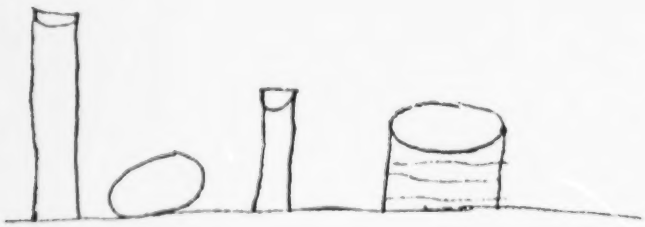
FIGURE 16. ***Drawing from Observation***

Horizontal relationships: 4 points. (All four objects are approximately correct in left-right order but not carefully observed and represented).
Vertical relationships: 4 points. (All four objects are approximately correct in height but not carefully observed and represented).
Relationships in depth: 1 point. (One object is above the base line).

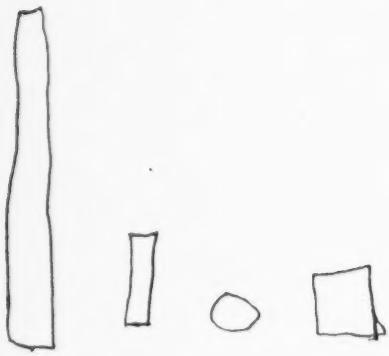
Horizontal relationships: 5 points.(The horizontal relationships are accurate).
Vertical relationships: 5 points (The vertical relationships are accurate).
Relationships in depth: 5 points (The relationships in depth are accurate and the layout sheet is included in the drawing).



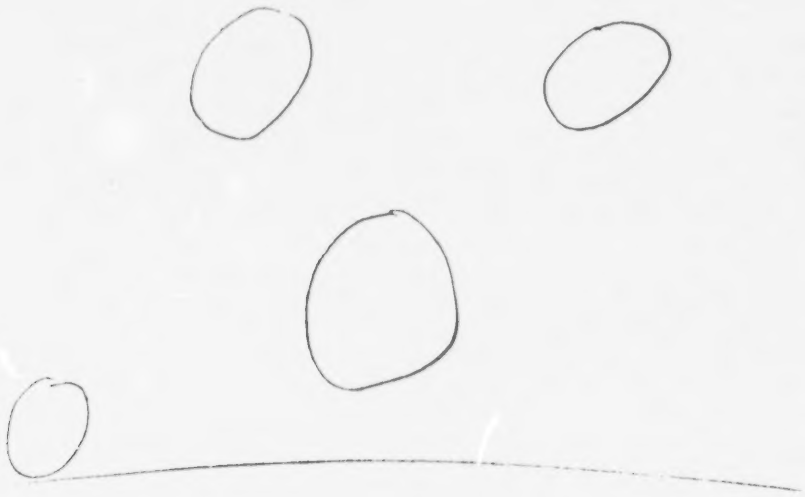
Horizontal relationships: 0 points. (No objects are in the correct left-right order).
Vertical relationships: 4 points (All four objects are approximately correct in height).
Relationships in depth: 0 points. (All objects are in a horizontal row).



Horizontal relationships: 2 points (Two objects are approximately correct in left-right order)
Vertical relationships: 3 points (Three objects are approximately correct in height).
Relationships in depth: 1 point: (Relationships in depth are incorrect).



Horizontal relationships: 0 points (No objects are in the correct left-right order).
Vertical relationships: 0 points (All objects are flat; there is no representation of height).
Relationships in depth: 1 points (Relationships in depth are incorrect).



Horizontal relationships: 3 points (Two pairs of objects are approximately correct in left-right order).
Vertical relationships: 0 points: (There is no representation of height).
Relationships in depth: 2 points. (Two objects are approximately correct in front-back relationships).

FIGURE 17. *Drawing from Observation by Lucille, an art teacher.*

Left-right	5
Above-below	5
Front-back	5
Subtest Total	15

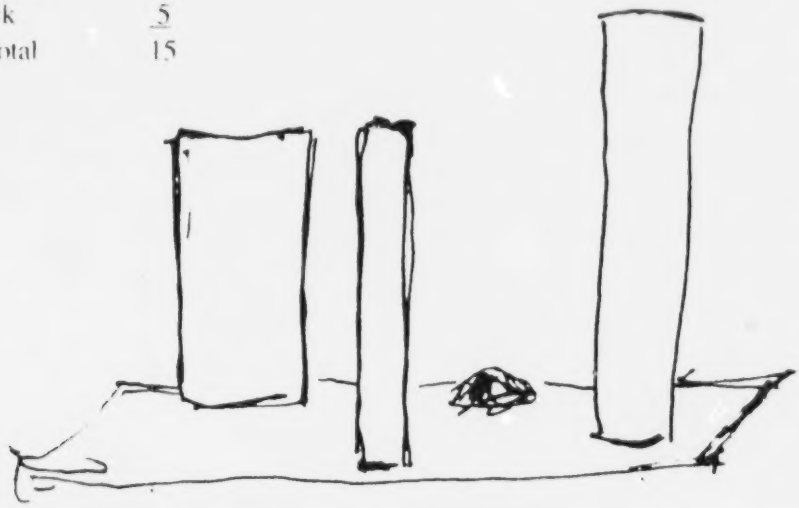
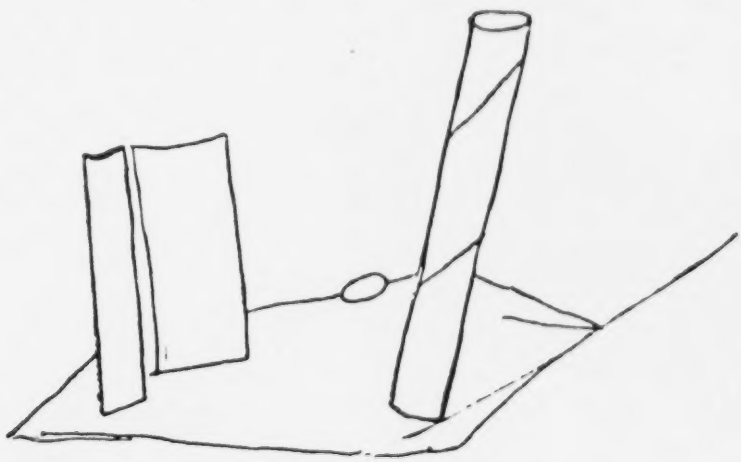


FIGURE 18. *Drawing from Observation by Mary, a social worker.*

Left-right	2
Above-below	4
Front-back	2
Subtest Total	8



Drawing from Imagination

FIGURE 19. *Drawing from Imagination by Betty, age 13. Severe Sensorineural and Receptive Language Dsabilities, Hearing Loss 78 dB in her hetter ear. No title.*

Ability to Select	2 points.	Most of Betty's subjects are unrelated in size or placement suggesting that she selected on the basis of perception, but rel ted the girl to the dog by drawing a leash, selecting on the basis of function.
Ability to Combine	3 points.	Although most of her subjects float in space, related only by proximity, the girl and dog are related along an implied base line.
Ability to Represent	3 points.	Betty has restructured the dog and added the leash.
Subtest Total	8 points.	Betty's score is below the average of 11.01 points for girls age 13-14, at the 18th percentile (see appendix B). Her low *SDT* score is supported by her *WISC* score of 64 (the *WISC* measure was not specified).

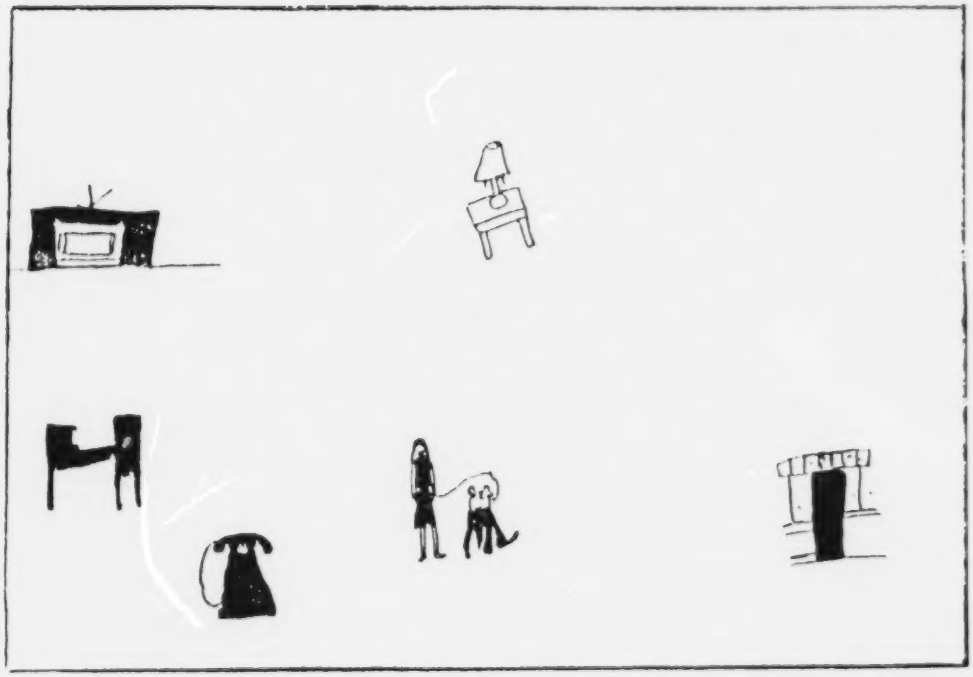


FIGURE 20. *Drawing from Imagination by Dan, age 15. Expressive Language Impairment, Normal Hearing. No title.*

Ability to Select	3 points.	Dan seems to have selected his subjects at the functional level - watching tv, boy riding bicycle, girl rollerskating.
Ability to Combine	2 points.	Although his drawing is fragmentary, a vertical line separates inside from outside with a door at the base.
Ability to Represent	3 points.	Dan restructured the stimulus drawing girl, boy, and tv and added the sidewalk, bicycle, etc.
Subtest Total	8 points.	Below average, at the 28th percentile.

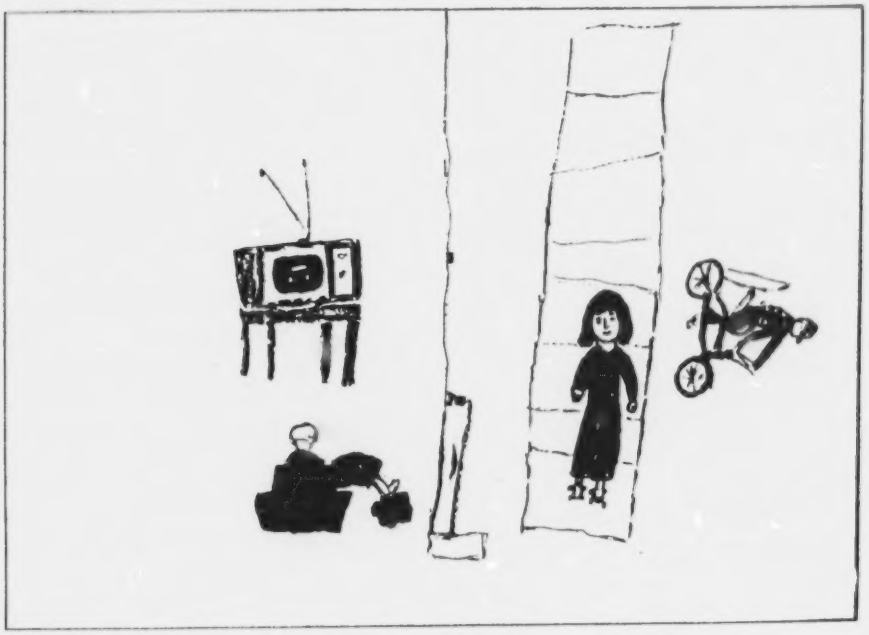


FIGURE 21. *Drawing from Imagination by John, age 8. Title: Victims of Death*

Ability to Select	5 points.	Imaginative, well-organized, shows abilty to deal with abstract ideas. The cat and bird belong to the class or category of "victim." "Death" is invisible.
Ability to Combine	5 points.	Overall coordination and a series of parallel drawings.
Ability to Represent	5 points.	Highly original, suggestive, and expressive.
Cognitive Total	15 points.	Above average, 99th percentile.

Although 8-years-old and in the third grade, John's response demonstrates abstract thinking which usually develops in adolescence (see Hornsby , p. 13). His maximum possible *SDT* score is supported by his *Otis Lennon* score of 130, and by his performances at the fourth grade level in reading and mathematics.

Projection Scale	1 point.	Strongly negative theme. Life-threatening relationships.
Self-Image Scale	3 points.	It is unclear whether John identifies with the victims, the predators, or the invisible, dispassionate narrator.

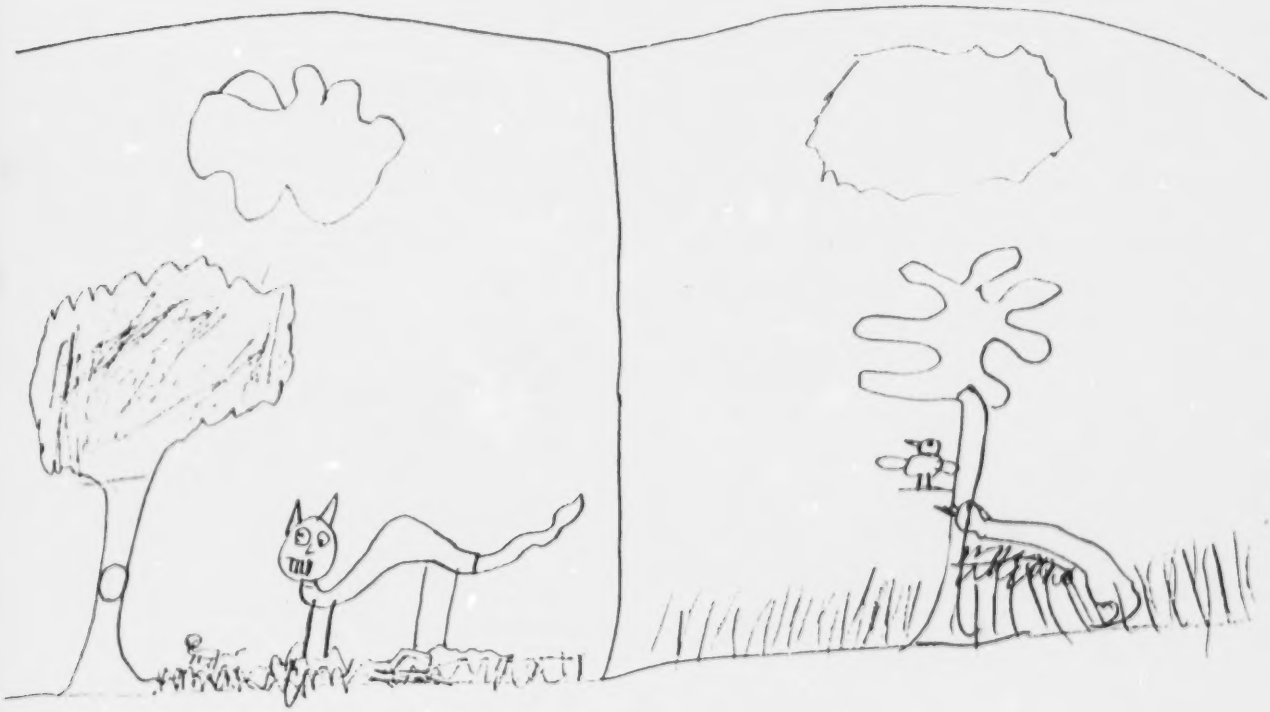


FIGURE 22. *Drawing from Imagination by Walter, age 17. Title: Survival of the Fittest*

Ability to Select	5 points.	Imaginative, well-organized, implies more than is visible.
Ability to Combine	5 points.	Overall coordination and a sequence of drawings.
Ability to Represent	5 points.	Highly original, expressive, and playful.
Cognitive Total	15 points.	

Projection Scale	1 point.	Murderous relationship. Aggressive humor.
Self-Image Scale	5 points.	Walter seems to identify with the powerful, assaultive, and effective snake.

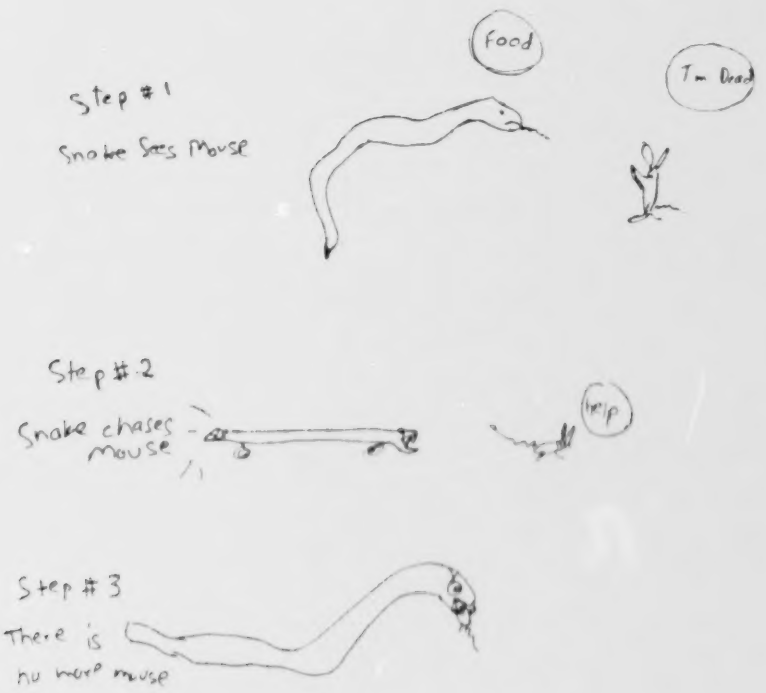


FIGURE 23. *Drawing from Imagination by Roy, age 17. Title: The Great House Murder*

Ability to Select	5 points. Imaginative, well-organized, implies more than is visible.
Ability to Combine	5 points. Overall coordination, takes into account the whole area.
Ability to Represent	5 points. Highly expressive, playful.
Cognitive Total:	15 points
Projection Scale	1 point. Solitary subject in mortal danger. Aggressive humor.
Self-Image Scale	5 points. Roy seems to identify with the narrator or the invisible murderer.

FIGURE 24. *Drawing from Imagination by Allan, 14,. Title: Possessed*

Ability to Select	5 points.	Imaginative, implies more than is visible.
Ability to Combine	5 points.	A series of drawings.
Ability to Represent:	5 points.	Highly original, expressive, and suggestive.
Cognitive Total	15 points.	
Projection Scale	1 point.	Possessed by the devil and forced to kill the person who calls him "son."
Self-Image Scale	3 points.	Ambivalent fantasy. Alan seems to identify with the person possessed.

FIGURE 25. *Second Drawing from Imagination by Allan, Title: Murder*

Ability to Select	5 points.
Ability to Combine	5 points.
Ability to represent	5 points.
Cognitive Total	15 points.

Projection Scale	1 point. Bank robber shoots, kills, wanted by the police, caught, handcuffed, electric chair.
Self-Image Scale	1 point. Alan seems to identify with the murderer in his fantasy.

Referral for clinical evaluation was recommended.

FIGURE 26. *Drawing from Imagination by Rita, age 10. Title: The Girl who Never Stops Crying*

Ability to Select	1 point.	Single subject. Rita chose only one stimulus drawing and did not add any subjects of her own.
Ability to Combine	1 point.	Single subject, no spatial relationships.
Ability to Represent	5 points.	Rita's story is highly expressive and suggestive. Although her drawing is constrained, the girl's eyes are averted and her hands are behind her back.
Cognitive Total	7 points.	
Projection Scale	1 point.	Solitary subject portrayed as sad and isolated.
Self-Image Scale	1 point.	Rita seems to identify with her sad subject.

Referral for clinical evaluation was recommended.

The Girl who Never Stops Crying
Once upon a time there was a little girl who lived with her mother and father And every day the little girl came home from school she was all ways crying And every day there ask mother are you crying she never tells she will always grive her mother a cooky and then she would go some where. Then day finally she came home from school not crying and was the day she told her mother why she was always crying.

FIGURE 27. *Drawing from Imagination by Connie, age 14. Title: The Dying Bride*

Ability to Select	5 points.	Implies more than is visible.
Ability to Combine	5 points.	Not base line level, note ceiling and light .
Ability to Represent	5 points.	Highly expressive and symbolic, note suicidal bride is in the basement (very low).
Cognitive Total	15 points.	
Projection Scale	1 point.	Solitary subject portrayed as suicidal.
Self-Image Scale	1 point.	Connie seems to identify with the bride who has stabbed herself in the abdomen and is crying, bleeding, and "dying." No hint of rescue or hope.

Suicidal fantasies indicate that thorough clinical evaluation is appropriate.

FIGURE 28. *Drawing from Imagination by Norris age 6. Title: The dog is biting the boy and the boy is saying Ouch!*

Ability to Select	3 points. Functional level (shows what the dog does to the boy).
Ability to Combine	3 points. Baseline level (implied).
Ability to Represent	3 points. Restructured (note the dog's teeth).
Cognitive Total	9 points.
Projection Scale	2 points. Moderately negative (hostile relationships).
Self-Image Scale	2 points. Norris seems to identify with the unfortunate boy.

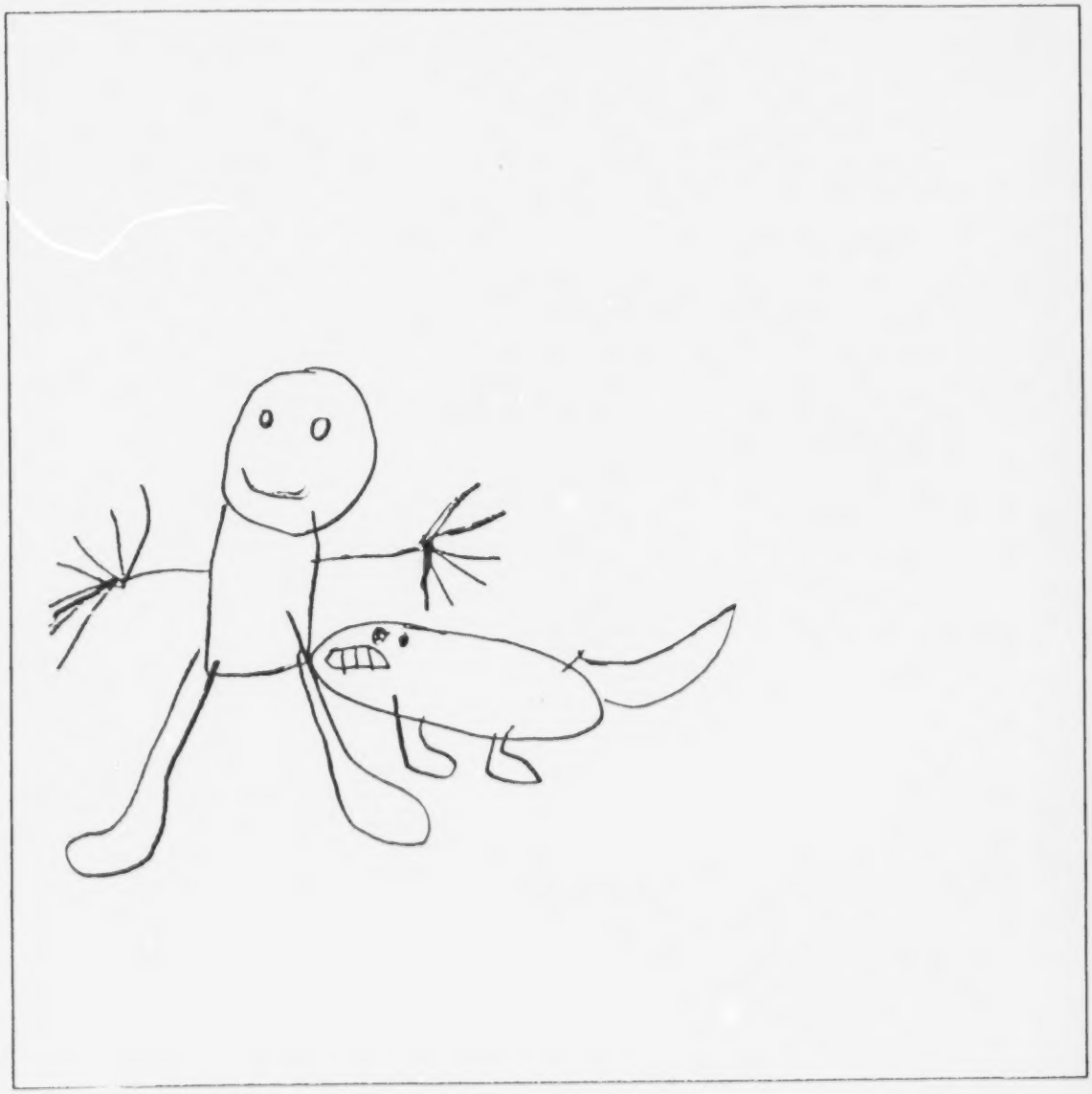


FIGURE 29. *Drawing from Imagination by Nora, age 18, Title: Impatiently waiting for my Mom to get out of the Operating Room.*

Ability to Select	5 points.	Although not particularly imaginative, this drawing is well organized and implies more than is visible.
Ability to Combine	5 points.	Uses depth and includes the whole drawing area.
Ability to Represent	4 points.	Moderately original and expressive.
Cognitive Total	14 points.	
Projection Scale	2 points.	Solitary subject is "impatient" (dissatisfied, angry).
Self-Image Scale	2 points.	Unpleasant fantasy. Seems to identify with the girl.

FIGURE 30. *Drawing from Imagination by Charlotte, age 9. Title: A Sneaky Snacker*

Ability to Select	5 points
Ability to Combine	3 points
Ability to Represent	5 points
Cognition Total	13 points

Projection Scale	3 points. Neutral theme, ambivalent, both negative and positive expresses conflict, perhaps self-deprecating humor.
Self-Image Scale	3 points. Ambivalent fantasy. Charlotte seems to identify with the girl portrayed as ambivalent. The title suggests that she will indulge.

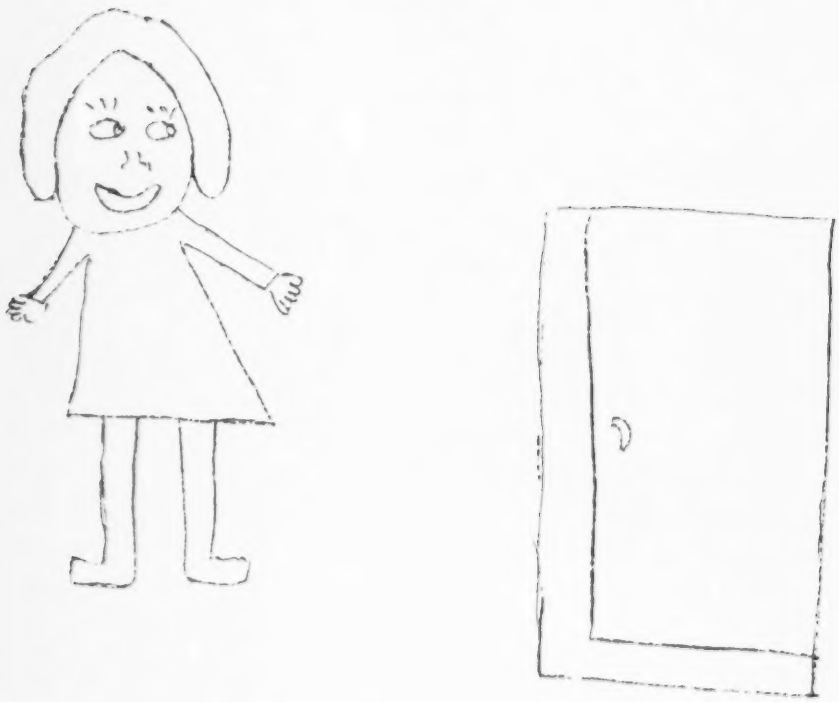


FIGURE 31. *Drawing from Imagination by Caroline, age 3 years 8 months. Title (dictated): The Dog is Chasing the Cat*

Ability to Select	3 points.	Functional level (shows what dog does to cat).
Ability to Combine	3 points.	Baseline level (implied).
Ability to Represent	2 points.	Beyond imitation.
Cognition Total	8 points.	
Projection Scale	3 points.	Unemotional, neither negative nor positive.
Self-Image Scale	3 points.	Ambiguous fantasy. Caroline seems to be the invisible narrator.

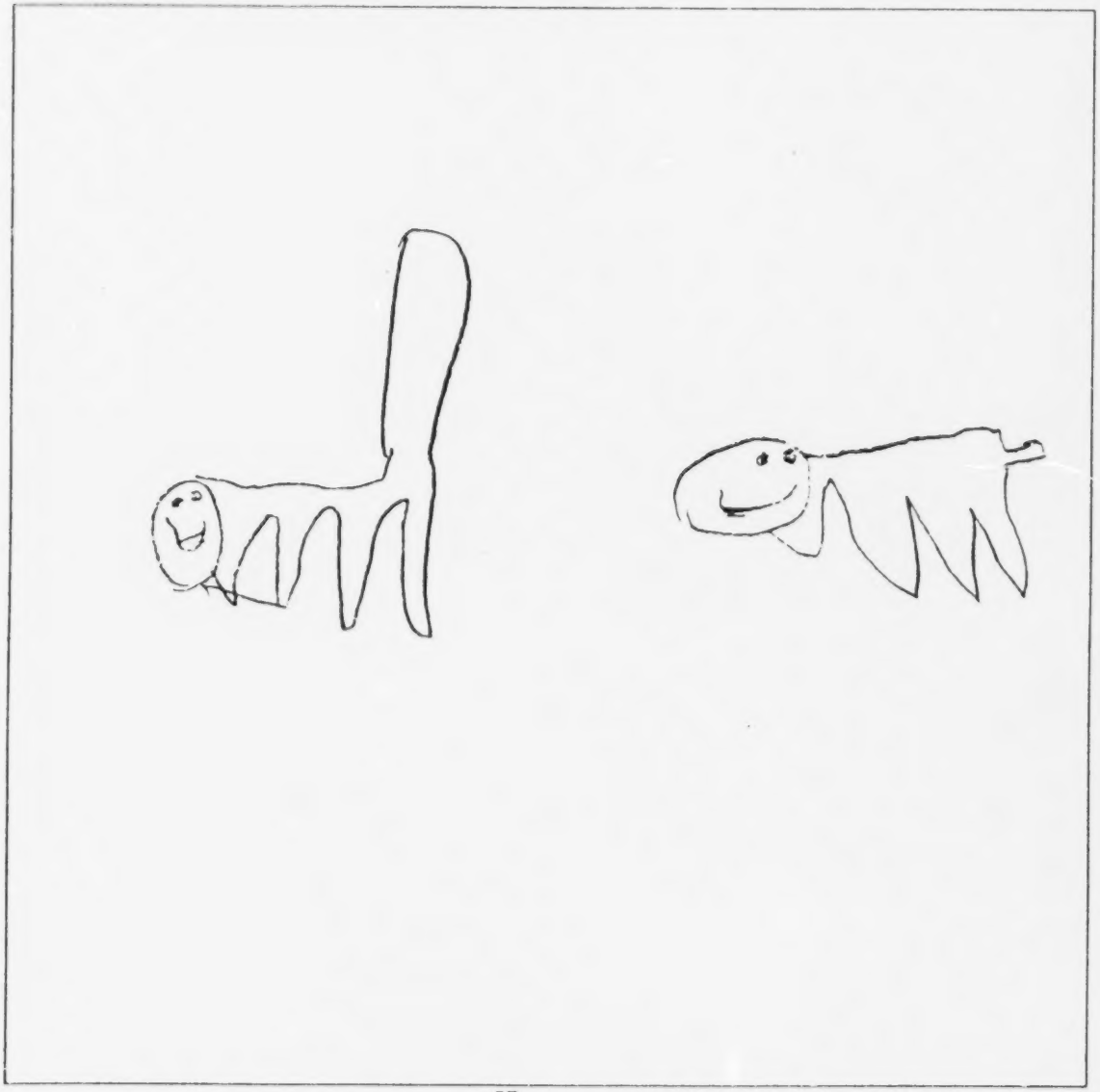


FIGURE 32: *Drawing from Imagination by Lauca, age 7. Title: The Bride.*

Ability to Select	3 points.	Functional level (shows what bride does).
Ability to Combine	4 points.	Beyond the baseline level, representing depth.
Ability to Represent:	4 points.	Form and content are moderately expressive.
Cognitive Total	11 points.	
Projection Scale	3 points.	Ambiguous, unclear. Both bride and groom appear unhappy.
Self-Image Scale	3 points.	Ambiguous, unclear. Why has the bride a mark on her cheek?

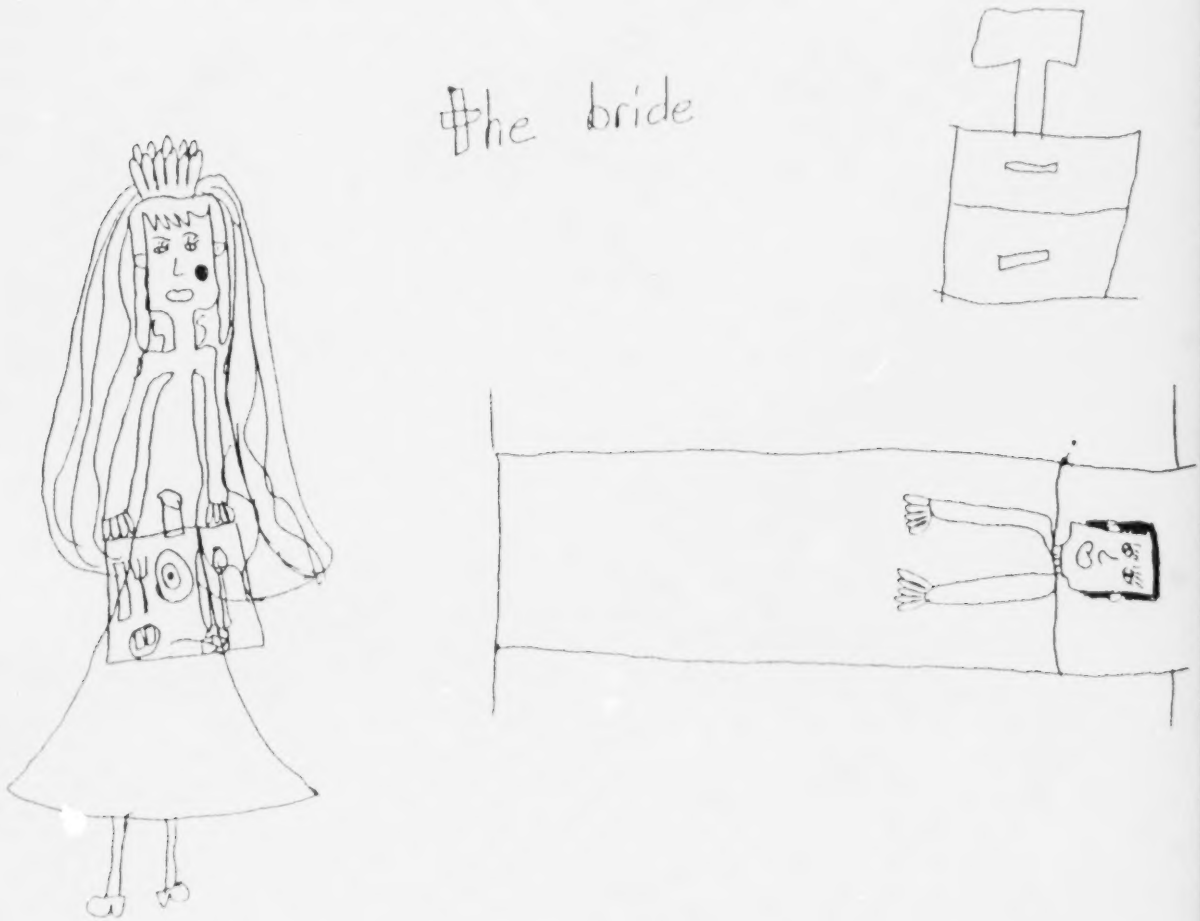


FIGURE 33. *Drawing from Imagination by Mrs L. Title: Food for thought. does Marriage Fill a Void?*

Ability to Select	5 points.	Implies more than is visible.
Ability to Combine	4 points.	Depicts depth.
Ability to Represent	5 points.	Highly original, suggestive, and playful words.
Cognitive Total	14 points.	
Projection Scale	3 points.	Ambivalent, ambiguous.
Self-Image Scale	3 points.	Ambivalent fantasy. The bride may represent herself; the frig, a metaphor for marriage.

FIGURE 34. *Drawing from Imagination by Gene, age 18. Title: Cat Sip or Cata-Tonic*

Ability to Select	5 points.
Ability to Combine	3 points.
Ability to Represent	5 points.
Cognitive Total	13 points.

Projection Scale — 4 points. Moderately positive theme. The cat is fortunate and enjoying the soda. Playful humor unlike the aggressive humor expressed in Figures 22 and 23.

Self-Image Scale — 4 points. Pleasant fantasy. Gene may identify with the cat or see himself as the witty narrator.

FIGURE 35. *Drawing from Imagination by Sara, age 14. Title: Going to the Malt Shop."*

Ability to Select	3 points.	
Ability to Combine	5 points.	
Ability to Represent	3 points.	Although Sara elaborated on the stimulus drawings, her response is not highly creative, playful or expressive.
Cognitive Total	11 points.	
Projection Scale	4 points.	Moderately positive theme. The solitary subject is fortunate but passively enjoying her soda.
Self-Image Scale	4 points.	Sara seems to identify with the girl.

FIGURE 36 *Drawing from Imagination by Bruce, age 16 Title, "The Great Escape."*

Ability to Select	3 points.	Concrete, shows what subjects do.
Ability to Combine	3 points.	Base line level, subject related along a base line
Ability to represent:	5 points.	Transformational, highly expressive, playful.
Cognitive Total	11 points	
Projection Scale	4 points.	Solitary subject portrayed as effective and achieving goals.
Self-Image Scale	5 points.	Wishfulfilling fantasy. Bruce seems to identify with the mouse escaping and frustrating the snake..

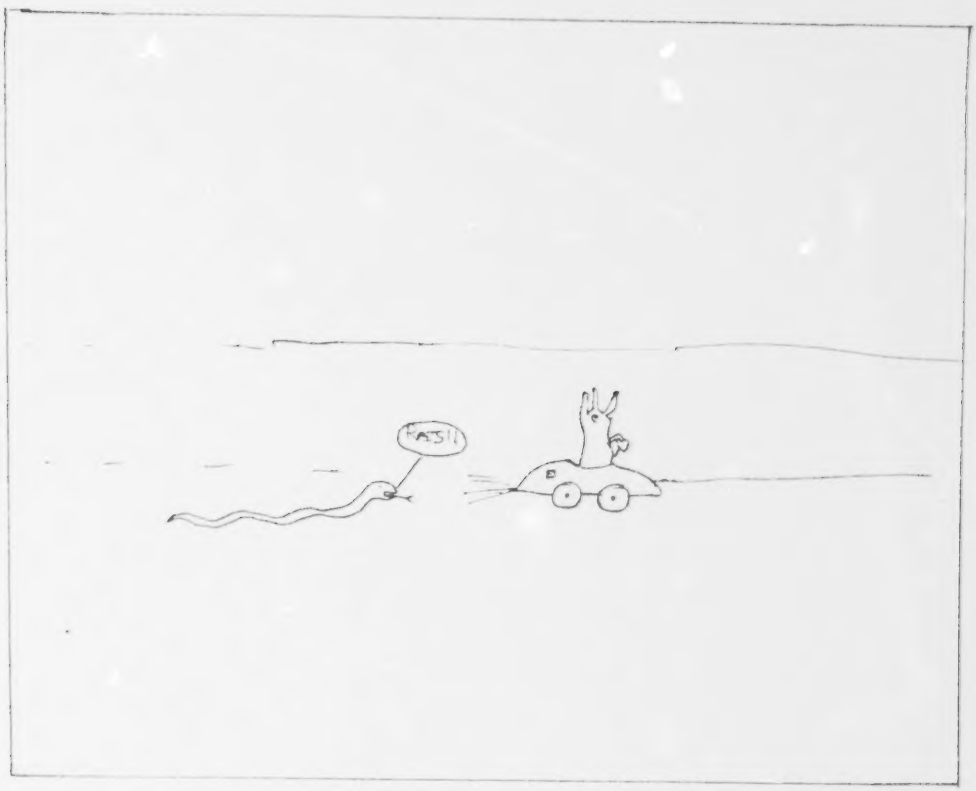


FIGURE 37: *Drawing from Imagination by Mrs G., an older adult. Title: Flying High with Family Love.*

Ability to Select	3 points.	Functional level. Shows what subjects do.
Ability to Combine	5 points.	Overall coordination.
Ability to Represent	4 points.	Beyond restructuring. Moderately expressive.
Cognitive Total	12 points.	

Projection Scale	5 points: Strongly positive theme, caring and loving relationships.
Self-Image Scale	5 points. Seems to identify with the woman at the head of the table.

FIGURE 38. *Pre-post SDT Responses by Mr O., Stroke Patient*

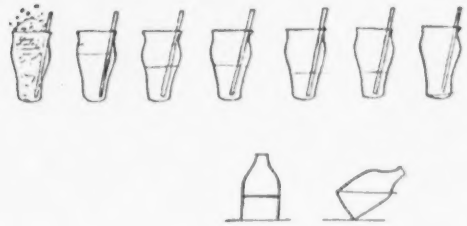
Although Mr O was not paralyzed, his stroke had left him with expressive and receptive language impairments. He could not read aloud or follow a sequence of commands, such as put the book on the table and the pencil in your pocket. He also confused verb tenses and had difficulty writing his thoughts. Although his words flowed smoothly, their meanings were unclear. His greatest difficulty lay in expressing concepts.

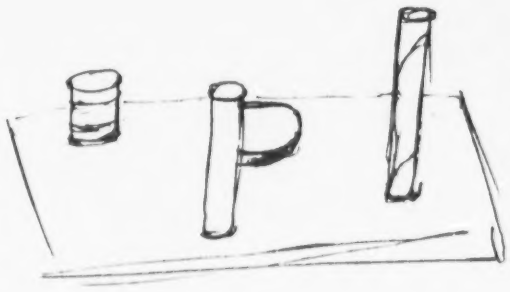
Discharged from the hospital, he returned once a week for therapy as an outpatient The four sessions in art therapy are described elsewhere (Silver, 1984).

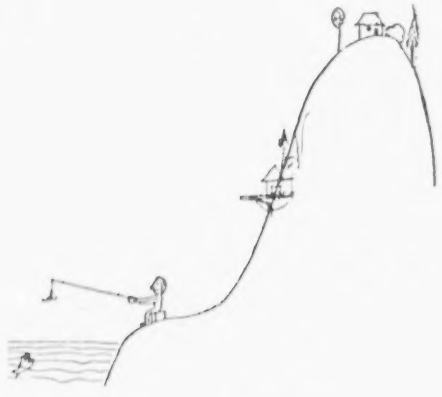
Pretest

Predictive Drawing		**Drawing from Observation**	
Ability to Sequence	5 points.	Left-right Relationships	5 points
Horizontality	5 points.	Front-back Relationships	5 points.
Verticality	5 points.	Above-below Relationships	5 points.
Subtest Total	15 points.	Subtest Total	15 points

Since Mr O. received maximum scores on the Predictive Drawing and Drawing from Observation pretests, there was no need for post-tests.

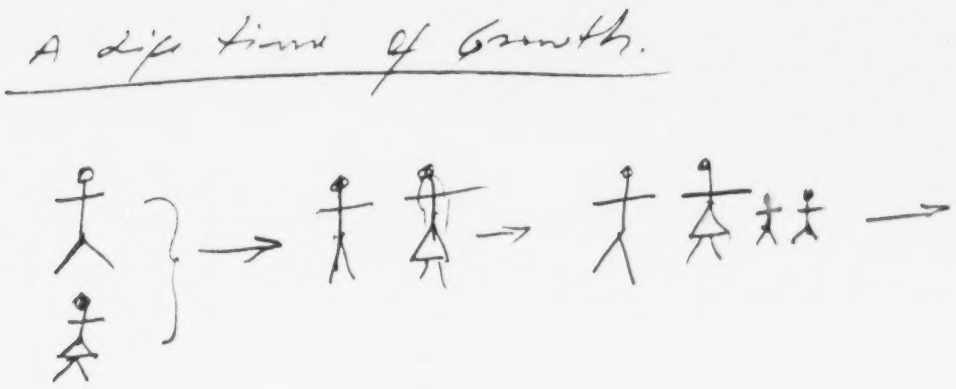






Mr O.'s Pretest Drawing from Imagination *Title: A Lifetime of Growth."*

Selecting: 3 Combining: 3 Representing: 1
Projection Scale: 4 Self-Image Scale: 3



Mr O.'s Post-test Drawing from Imagination *Title: Hedges may hide surprises."*

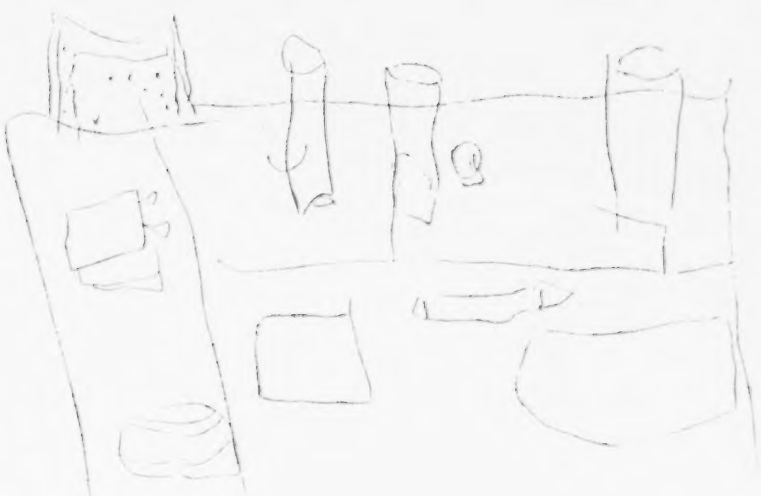
Selecting: 4 Combining: 4 Representing: 4
Projection Scale: 3 Self-Image Scale: 3

FIGURE 39. *Drawings from Observation and Imagination by Gary, 15, hospitalized stroke patient unable to speak.*

Paralyzed on both side of his body, Gary could not sit without support nor prevent saliva from escaping his mouth. Since his movements were limited to two fingers of his left hand, he responded to the drawing tasks with felt-tipped markers held between his fingers.

Drawing from Observation

Left-right	2 points.	Two objects are in the correct left-right order.
Above-below	2 points.	Two objects are correctly related in height.
Front-back	3 point.	Three objects are correctly related in depth.
Subtest Total	7 points.	



Gary's Drawing from Imagination

Title: "Dreaming About a Dune Buggy."

Although Gary could not speak, he pointed to letters of the alphabet printed on a board resting on his lap, spelling out his title and indicating the ends of words by tapping the board as though tapping the space bar of a typewriter.

Ability to Select	5 points.	Highly imaginative, implies more than is visble.
Ability to Combine	5 points.	Overall coordination, includes drawing area.
Ability to Represent	5 points.	Highly, creative, expressive, and playful.
Subtest Total	15 points.	

Projection Scale	3 points.	Ambivalent, both negative and positive.
Self-Image Scale	3 points.	Gary seems to represent himself as the turned-on car, a metaphor for his immobilized self dreaming of romance.

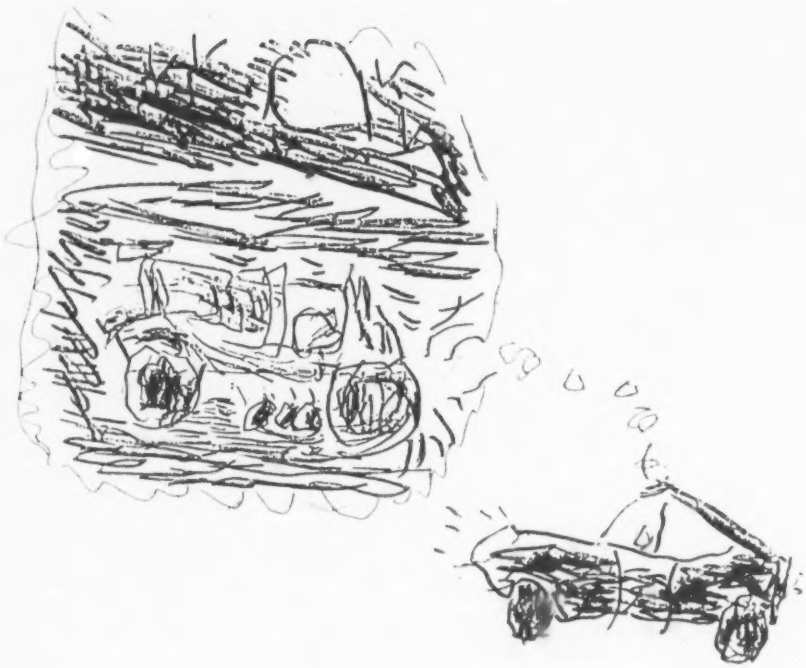
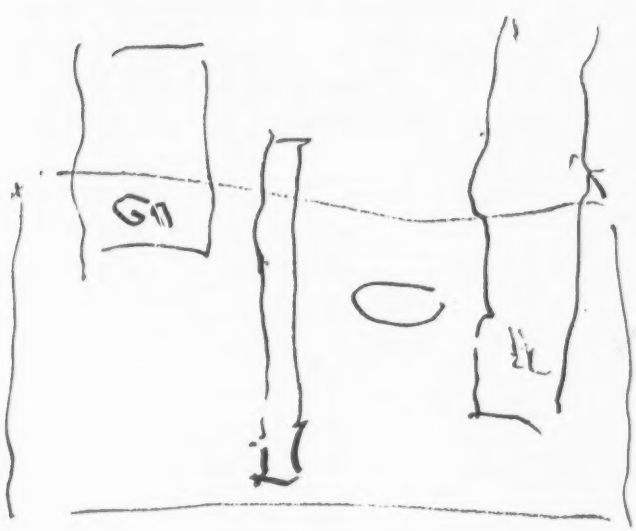


FIGURE 40. *Drawings from Observation and Imagination by Mrs M., hospitalized stroke patient unable to speak.*

Drawing from Imagination		Drawing from Observation	
Ability to select	1 point.	Left-right	5 points.
Ability to Combine	1 point.	Above-below	4 points.
Ability to Represent	1 point.	Front-back	4 points.
Subtest Total	3 points	Subtest Total	13 points

Mrs M's receptive language and ability to select subjects and perceive spatial relationships seems intact but her ability to combine and represent seems impaired, extending beyond expressive language to inability to synthesize the parts of her drawing from imagination into an integrated whole.



Chapter 5

Reliability and Validity

Reliability in scoring the *SDT* has been examined in 7 studies of inter-scorer and test-retest reliability.

Inter-Scorer Reliability

To determine the reliability of scores on the *SDT*, inter-scorer reliability coefficients were computed.

1. Comparing Evaluations of SDT Subtest Scores by Seven Judges

The judges were 7 graduate students in art therapy who were participating in a research project funded by the National Institute of Education (Silver et al, 1980, p.17). The judges participated in a series of training sessions. Subsequently, they scored the test booklets of six children, identified by number rather than by name. Separate reliability coefficients were computed for each subtest. The results are presented in Table 1.

TABLE 1. *Inter-Scorer Reliability Coefficients for the SDT by Seven Judges*

Subtest	*r*
Predictive Drawing	.93
Drawing from Observation	.91
Drawing from Imagination	.96

These results indicate a high degree of inter-scorer reliability. The judges assigned similar ratings to the response drawings in all subtests.

2. Comparing Evaluations of Self-Image and Emotional Content Scores by Five Judges

Five judges evaluated responses to the Drawing from Imagination task in order to determine reliability for the Self-Image Scale and the Emotional Content Scale. Four judges were registered art therapists; the fifth, a graduate student in a university art therapy program.

The judges scored 5 responses selected at random from a group of 15 responses by 7 males, 8 females, 4 children, 5 adolescents, and 6 adults. The Judges met for approximately one hour to practice scoring the ten unselected responses, then independently scored the 5 selected responses. The ratings for each of the two scales were analyzed separately.

Using the statistic Intraclass Correlation (ICC), a measure of inter-rater reliability, the results obtained are shown in Table 2.

TABLE 2. *Inter-Scorer Reliability for the Self-Image and Emotional Content Scales for Five Judges*

	ICC
Emotional Content Scale	0.94
Self-Image Scale	0.74

These data show strong reliability for the Emotional Content Scale; moderate reliability for the Self-Image Scale. Thus it appears that the scales show inter-scorer reliability.

Judges Training

The following studies were undertaken to determine the adequacy of the *SDT* scoring guidelines for judges who did not participate in training sessions.

3. Comparing Evaluations of Cognitive Skill by A Registered Art Therapist with No Special Training and the Author

The director of an art therapy program in Pennsylvania scored test booklets administered to 16 tenth-grade students and 20 fourth-grade students. He used the guidelines provided in a preliminary version of the *SDT* manual. The booklets were subsequently scored by the author (who had not met him).

All correlations were found significant, five at the .01 level and one at the .05 level, as shown in Table 3. These data show moderate reliability. They

suggest that the scoring guidelines alone are adequate when used by a registered art therapist, and that training sessions for such examiners are unnecessary.

TABLE 3. *Correlations for Subtests Scored by a Registered Art Therapist with No Special Training and the Author*

Subtest	*r*	*p*
Tenth Graders (*n*=16)		
Predictive Drawing	.71	.01
Drawing from Observation	.81	.01
Drawing from Imagination	.79	.01
Fourth Graders (*n*=20)		
Predictive Drawing	.86	.01
Drawing from Observation	.45	.05
Drawing from Imagination	.65	.01

4. Comparing Evaluations of Cognitive Skill by a Registered Art Therapist with No Special Training and the Author

A registered art therapist in Virginia who learned to score the *SDT* by reading its manual, administered the *SDT* to nine mentally handicapped hospitalized adults. The test booklets were scored by the art therapist and the author.

The judges displayed a high degree of agreement in scoring the tests as shown in Table 4. These data show strong reliability, again suggesting that training sessions for registered art therapists are not necessary.

TABLE 4. *Correlations for Subtests Scored by an Art Therapist with No Special Training and the Author (N = 9).*

Subtest	*r*	*p*
Predictive Drawing	.99	.01
Drawing from Observation	.89	.01
Drawing from Imagination	.91	.01
Total	.96	.01

5. Comparing Evaluations by a Classroom Teacher, a Psychotherapist, and Three Art Therapists

In revising the *SDT* manual for the second edition, changes were made in the wording of the scoring guidelines in an attempt to make scoring more precise. To determine whether the changes would affect scorer reliability, the test performances of ten children were scored by five scorers using the revised guidelines. Reliability coefficients were computed for their evaluations of the total test scores of ten third graders in a public school in Nebraska.

The judges included the children's teacher in Nebraska who learned to score the *SDT* by reading its manual, the psychotherapist in Florida, and three art therapists in Pennsylvania. Scorers A and B were registered art therapists who had learned about the SDT by reading its manual, and scorer C was a graduate student who learned about the test from scorer A. None of the scorers had met the author.

Significant correlations at the .01 level were found as indicated in Table 6, suggesting that training sessons are also unnecessary for teachers and psychotherapists.

TABLE 5. *Interscorer Reliability Coefficients of Evaluations by Five Judges*

Mean = 32.55
S.D. = 4.5
r = .66
p < .01

Retest Reliability

To determine the test-retest reliability of the *SDT*, it was administered on two occasions to groups of children and adolescents. Their responses were scored and reliability coefficients computed.

6. Comparing performance scores of 12 learning-disabled adolescents after an interval of approximately one month.

Moser (1980) used the *SDT* in her doctoral project, administering it twice to 12 learning disabled adolescents with a time lapse of approximately one month, and computed reliability coefficients for each subtest. All correlations were significant at the .05 level. The test-retest reliability scores are strong in Drawing from Observation and "Ability to Represent Spatial Concepts" (Moser's term for Predictive Drawing) but weak in Drawing from Imagination, as shown in Table 6.

TABLE 6. *Test-retest Reliabiliy Coefficients of LD Adolescents, Moser Study*

Subtest	r	p
Predictive Drawing	.8036	.05
Drawing from Observation	.8401	.05
Drawing from Imagination	.5637	.05

7. Comparing the performance scores of ten children after an interval of approximately one month.

The *SDT* was administered to all children in a third grade class by their teacher in an urban public school in Nebraska during November, 1989. She administered the test again, in December, 1989, to ten of the children whom she described as the "top students across the board." Limiting the retest group to top scorers limits the reliability of the findings.

Responses to the test were scored by five judges To insure that the judges would score blindly, the drawings were identified only by first names. The first test performance by each examinee was identified by the child's real name; the second, by a fictitous name beginning with the same letter of the alphabet. For example, Sandra's second booklet was named Susie, and Andrew's second booklet, Arthur. Thus the judges assumed they were scoring one test performance by each of twenty children but were actually scoring two test performances by each of ten children.

Moderate correlations were found in *Drawing from Imagination*, and in total test scores. Low correlation were found in *Drawing from Observation.* No significant correlations were found in *Predictive Drawing*, as shown in Table 7.

TABLE 7. *Test-retest Reliability Coefficients of Third Graders*

Subtest	r	p
Predictive Drawing	.08	ns
Drawing from Observation	.61	05
Drawing from Imagination	.70	.02
Total	.72	.02

The inconsistencies in test-retest correlations between studies 6 and 7 suggests that the Drawing from Imagination subtest may be an unstable construct for learning disabled adolescents but not children, whereas the Predictive Drawing subtest may be unstable for children but not adolescents.

A review of the children's responses to the Predictive Drawing task found that in the retest, two children failed to draw any lines in the tilted bottle, thus lowering their scores from 4 points in the first test to zero in the retest. Two other children had apparently learned that water remains horizontal regardless of the tilt of its container, raising their scores from 1 point on the first test to 5 points on the second test.

In addition, one child scored 5 points in the first test, drawing a sequence of descending lines in the soda glasses without corrections. In the retest, however, she erased the lines she drew in the glasses, thus lowering her score to 3 points.

In the *Predictive Drawing* task, scores are based on observations by Piaget and Inhelder who find that children use trial and error when they do not know the solutions to problems. When they do know the solutions, however, they proceed systematically without resorting to trial and error. Since this child had represented a sequence systematically in the first test, it seems unlikely that her erasures in the second test reflected trial and error. It may be, instead, that the erasures reflected feelings of insecurity or a desire for perfection. At any event, the variations in retest scores suggest that the visuo-spatial abilties measured by the Predictive Drawing task may be unstable in this age group. This test-retest reliability underestimates the reliability of the test.

Validity

The *SDT* has been examined for evidence of pre-test/post-test change and evidence from distinct groups. It has also been examined for its relationship to traditional tests of intelligence or achievement, and for evidence of changes with age.

Evidence of Pre-Test/Post-Test Changes in Distinct Groups

1. Comparing the Pretest/Postest Scores of 34 Language/Hearing-Impaired, 34 Control, and 68 Unimpaired Children

The *SDT* was initially developed in a State Urban Education Project in which one art therapist worked with an experimental group of 34 language- and hearing-impaired children (Silver, 1973). The aim of the Project was to develop cognitive skills through art experiences. The experimental group was a randomly selected 50-percent sample of 12 classes in a special school for these children. The remaining 34 children served as controls. Their ages ranged from 8 to 15 years. The *SDT* was administered before and after the intervention, an art program provided once a week for 11 weeks in the fall, 9 weeks in the spring.

To compare these children with children who had no known impairments, the *SDT* was also administered once to children in a suburban public school.

Changes in Drawing from Imagination

Improvement in the experimental group was found at the .01 level in the combined abilities of selecting, combining, and representing, as shown in Table 8. Comparing scores of the experimental group with the normal group (N=63), the normal children were superior on the pre-test but not quite significantly better. On the post-test, however, the impaired experimental children (N =34) were significantly superior to the normal children.

The pre-test mean of the experimental group was 8.0; their post-test mean was 11.47; $t = 3.62$, significant at the $p < .0.01$ level with df = 33 (two-tailed test). They also performed significantly better than the children in the control group at the .01 level. The post-test mean score of the control group was 8.44.

Changes in Drawing from Observation

The experimental group improved significantly at the .05 level. The control group did not improve, as shown in Table 9. Although the normal children had higher scores on the pretest and the handicapped experimental children had higher scores on the post-test, there was no significant difference between the groups. The pre-test of the experimental group was 9.37; their post-test mean was 11.43;

$t = 3.03$, significant at the $p < 0.05$ level, with df = 15 (two-tailed test). The pre-test mean of the control group was was 8.56; their post-test mean was 8.50. The mean for the unimpaired children was 9.63 ($t = .5877$).

TABLE 8. *Comparing Pre-Test Post-Test Scores of Language/Hearing Impaired, Control, and Unimpaired Children*

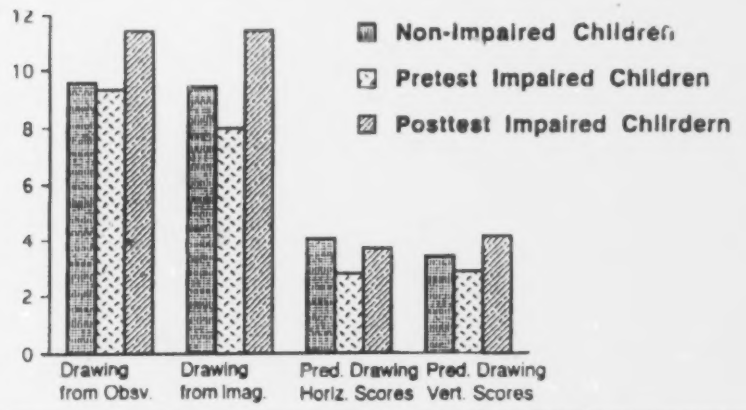
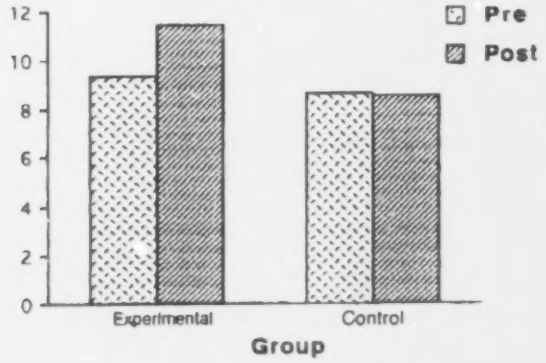


TABLE 9. *Comparing Pre-test Post-test Scores of Language/Hearing Impaired Experimental and Control Groups*



Chnages in Predictive Drawing

Comparing mean scores of the handicapped experimental children before and after the art program, significant improvement was found at the $p < .01$ level. The control group did not improve. Comparing handicapped and normal children, the normal children had significantly higher scores on the pretest in both horizontal

and vertical orientation. After the art program, however, no significant difference was found in horizontal orientation while in vertical orientation, the handicapped experimental children improved to a degree in which they were significantly superior to the unimpaired children.

In horizontal orientation, the pre-test mean of the experimental group was 2.88; their post-test mean was 3.76; $t = 5.50$, significant at the $p < 0.01$ level with 67 df. In vertical orientation, their pre-test mean was 2.91; their post-test mean was 4.11; $t = 8.57$, significant at the $p < 0.01$ level. Thus there was highly significant improvement in mean horizontal and vertical scores after the art program. The experimental and control groups had the same mean score on the horizontal pre-test (2.88); on the vertical pre-test, the experimental group mean was 2.91, the control group mean was 2.82.

For the 68 unimpaired children the mean score was 4.059 in horizontal orientation. Since the mean for the 68 impaired children was 2.88, t value was 5.695, significant at the $p < 0.01$ level, with df = 146. Following the art program, the experimental children were no longer significantly inferior to the unimpaired children although they had slightly lower scores. The post-test mean for the impaired experimental children was 3.55; t = 1.1278, not significant.

In vertical orientation, the mean for the impaired children was 2.87; for the unimpaired, 3.485; $t = 2.543$, significant at the $p < 0.05$ level with df = 146. After the art program the mean score of the experimental impaired children was significantly higher than that of the unimpaired children. The post-test mean for the experimental group was 4.11; $t = 2.358$, significant at the $p < 0.05$ level, with df = 112.

Changes in Creativity and Art Skills

To test the theory that emphasizing cognition need not interfere with aesthetic and creative growth, two judges, a university professor of art and a registered art therapist/painter were asked to evaluate three drawings or paintings produced by each child in the fall program experimental group (N=18): the child's first work, last work, and a work produced at mid-term. The 54 drawings and paintings were identified only by number and shown in random order to conceal the sequence in which they had been produced.

The judges, working independently, rated each work on a scale of 1 to 5 points for sensitivity and skill, as well as for ability to represent objects or events. The scale ranged from the low level (imitative, learned, impersonal, scored 1 point), to a moderate level (going beyond description to elaborate or edit an experience - 3 points), to the the high level (beyond restructuring, highly personal, imaginative, inventive - 5 points).

Both judges found improvements that were significant at the .01 level. As rated by the art-therapist painter, the mean score for artwork produced in the first class was 4.44; the mean score for work produced in the last class was 7.27; $t =$

3.13, significant at the $p < 0.01$ level. As rated by the university professor of art, the mean score of the work produced in the first class was 3.66; the last class, 6.33; $t = 3.29$, significant at the $p < 0.01$ level.

In skill and expressiveness combined, the university professor of art gave four children the lowest score on their first works and the highest score on their last works. The art-therapist painter found the same improvements in six children. (Silver, 1973 and 1978/1986/1989, p. 225).

Thus the findings of this study support the theory that emphasizing cognitive development does not interfere with aesthetic and creative development. The study found evidence of pre-test post-test gains in both cognitive and creative skills before and after the 11-week art tharapy program, evidence that cognitive, aesthetic, and therapeutic goals can be pursued concurrently.

The study also found evidence of initial cognitive differences between children with language/hearing impairments and children with no known impairments, as well as evidence that art therapy interventions seem to bring about change, enabling the impaired group to catch up and even excel. Before the art program, the children in the experimental group lagged behind in Drawing from Imagination and Predictive Drawing. After the art program, they equalled or surpassed the unimpaired children This art program and the progress made by one of the participants, Burt, are discussed in Chapter 7.

2. Pre-Test/Post-Test Changes in the *SDT* Scores of 11 Children with Visual-Motor Disabilities

This study raised two questions: would the testing and teaching procedures developed in the State Urban Education Project be useful with children who have an opposite constellation of disabilities - visual-motor weaknesses rather than language and hearing impairments, and whether the art therapy procedures could be used effectively by art therapists other than the one who developed them (Silver & Lavin, 1977).

Eleven graduate students who had registered for a course in using the art procedures, worked under supervision with 11 children. The children were not systematically selected but were enrolled as their applications were received.

After ten one hour classes , the children improved significantly in the three areas of cognition. In ability to select, combine, and represent concepts in Drawing from Imagination, the obtained t value (4.79) was significant at the $p < 0.01$ level. In Drawing from Observation, the obtained t value was (2.42) was significant at the

$p < 0.05$ level. In sequential ordering, the obtained t value (6.54) was significant at the $p < 0.01$ level.

The success of this training program indicated that art therapy procedures can be used to assist learning disabled children in expressing concepts nonverbally through visual-motor channels in spite of impaired functioning in this area. Through cognitively oriented experiences with drawing, painting, and modeling clay, these children developed skills for bringing order to their perceptually disordered worlds. The variety of media provided tactile and kinesthetic feedback while the art experiences provided practice in the cognitive visual skills. It should be noted that the art therapy interventions emphasized a success-oriented, nonthreatening atmosphere in conjunction with enjoyable art activities which encouraged these children to make significant progress in the cognitive skills that were the focus of this study.

In a third study the following year, another group of graduate students worked under supervision with 11 normal children who had been selected by school administrators as achieving below grade level academically for a variety of reasons (Silver, 1982). There was no control group. Again, these children made significant gains: at the $p < .01$ level in Drawing from Imagination, and at the $p > .05$ level in both Predictive Drawing and Drawing from Observation.

3. Correlations Between Pre-test and Post-test Scores of Normal and Learning-Disabled Children in Five Schools

This project, supported by a grant from the National Institute of Education, built upon the previous studies, attempting to verify their results by using a more controlled research design, a wider variety of settings, and a more diverse population (Silver, Boeve, Hayes, Itzler, Lavin, O'Brien, Wohlberg, & Terner, 1980. In addition to providing the art therapy program, the project examined the relationship of the *SDT* to traditional measures of intelligence or achievement, as will be discussed later in this chapter.

Subjects were 84 children, ages 7 to 11, who had been selected by school administrators for being at least one year below grade level in reading or mathematics. The children attended five urban and suburban schools in New York: a school for learning-disabled children, and four schools for both normal children and children with special educational needs. From this population, an experimental group was selected based on their *SDT* scores. As originally planned, only those

children who received scores of at least 3 points in Drawing from Imagination would participate, but it was necessary to include many children with lower scores in order to find enough children in each school. A matched control group received no special treatment. During the course of the program, a number of children were lost for a variety of reasons. Consequently, additional children were randomly removed to equal the number in each group for statistical analysis.

Five graduate students in art therapy, one in each school, worked with two groups, each comprising five children, for approximately 40 minutes a week for 12 weeks. During the first 6-week period, all art therapists used the same procedures. During the second 6-week period, they adapted the procedures to meet the needs of individual children, and devised procedures of their own. They administered *SDT* before and after the art program to the experimental and control groups.

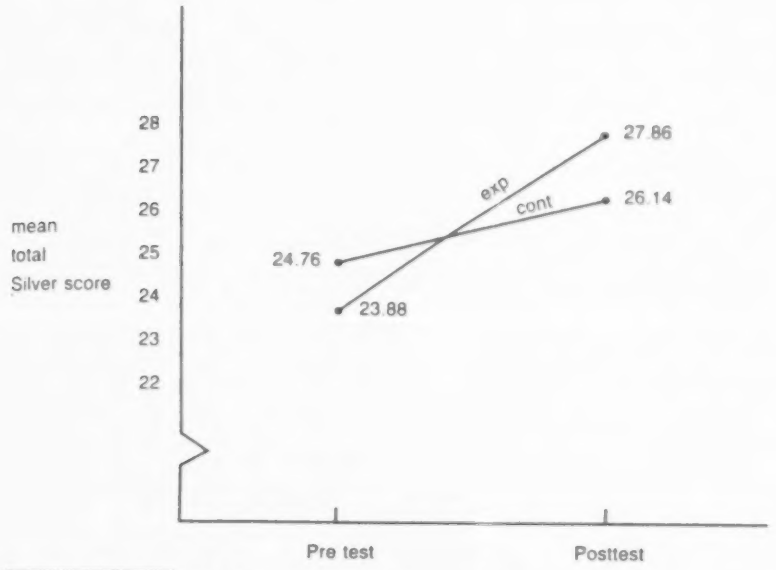
As in the earlier studies, the post-test scores of the experimental group showed significant gains over the pre-test scores; however, there was no significant difference between post-test scores of experimental and control groups, as shown in Table 10.

After the program ended, the SDT scoring guidelines were modified and tightened, and all test booklets were rescored blindly. The scores were then re-analyzed, but essentially the same results were found. However, a school by school analysis of net change scores (pre-test minus post-test scores) showed significant differences in one school, the school for learning-disabled children. In this school, the post-test scores of the experimental group were significantly higher than the the post-test scores of the control group.

It is not clear why the school for learning disabled children was the only school with significant differences between post-test scores of experimental and control groups, and why the gains in the previous studies failed to materialize. The finding may reflect the superior skills of one art therapist, or reflect too much flexibility in the art procedures used. By specifying what procedures to use in only 6 of the 12 art periods, too many variables may have been introduced (The 6 weekly procedures are discussed in Chapter 7 and presented in Appendix C).

On the other hand, this finding may reflect distinctions between learning disabled children and other children who performed at least one year below grade level in reading or mathematics. Whitmore (1980) observed that learning disabled children were sometimes confused with gifted children whose major deficits were feelings of inadequacy. It may be that the learning disabled children who participated in this project were gifted children with feelings of inadequacy who had

Table 10. *Comparing Pre-test and Post-test Mean Scores of Learning Disabled Children and Normal Children Performing One Year below Grade Level*



* Both posttest scores differed significantly from pretest scores ($p. < .05$). In addition, the experimental group's posttest scores differed significantly from the combination of the other three groups of scores. Analysis and Figure 9 prepared by John Kleinhans, PhD

thrived in the supportive art therapy program. In each of the five schools, there were individual children who made dramatic gains in all test scores, as discussed in the case examples of the project report (Silver, et al, 1980)

The behavior of another child, Joey, suggests that he may have been a gifted child with feelings of inadequacy but diagnosed as learning disabled.

Joey

Joey lived in Canada and although his school was not among those participating in the NIE project, the remediation teacher had asked if she might join. It was arranged that she would work with Joey using our teaching procedures. Joey, age 8 in the second grade, had been diagnosed as learning disabled with particular difficulty in learning to read. His IQ score was 91, below average as measured by the *Canadian Cognitive Abilities Test (CCAT).* Only 2 of the 24 children in his class had lower scores. As measured by the *SDT*, however, Joey was far above average in one subtest, and far below in another.

In Drawing from Imagination, Joey's score placed him in the 99th percentile based on 103 second graders in the *SDT* normative sample (see Appendix 2). It was also the highest score in his class. On the other hand, his score in Drawing from Observation was in the 14th percentile, and was the lowest in his class. Except for Joey, most of his classmates were about as successful in Drawing from imagination as they were in the *CCAT*. To illustrate, the three children with the next highest scores in Drawing from Imagination received *CCAT* scores ranging between 123 and 150.

In Joey's Drawing from Observation, only one of the four objects was in the correct Left-right position. He confused horizontal and vertical relationships and failed to show depth. In his post-test Drawing from Observation, however, his score rose from 4 to 10 points, placing him in the 83rd percentile. Joey's other responses to the art program are reported elsewhere (Silver, 1983; 1987).

While the art program with Joey was in progress, the *CCAT* was again administered in his school. Joey's score increased 8 points, from 91 to 99 whereas the mean score of his classmates decreased from 113 to 108. Could art experience have affected his gains and losses? Was it the individual attention and concern of his teacher? There are no answers, unfortunately; Joey's teacher died suddenly. Inquiries about his academic progress provided scant information, and when the *CCAT* was administered the following year, his score had dropped to 90.

These findings seem to support the theory that the *SDT* taps cognitive skills not tapped by traditional language-oriented tests, and suggest that it can be useful in identifying individuals like Joey whose intelligence had escaped detection, or Charlie whose intelligence was masked by language deficiencies, or Allan whose intelligence was masked by emotional problems.

4. Using the *SDT* as a Pre-Post Test to Determine the Effectiveness of a Developmental Program for Learning Disabled Children

Marshall (1988) used a developmental program to enhance the cognitive skills of two groups of learning disabled children in a Special Education setting in Maine. The program included painting, drawing from observation, stimulus drawings, modeling clay, and "imagination games." The *SDT* and a second measure consisting of ten conservation tasks were administered before and after the program to determine whether abilities improved. Group A included five children ages 7 to 10 who attended 14 sessions. Group B included four children ages 13 and 14 who attended 9 sessions.

The young children in Group A showed increases in mean total scores from 16.46 to 21.09, gaining in each of the three *SDT* subtests. The most marked and

consistent gain was in Drawing from Imagination. The adolescents in Group B showed little gain, their mean total scores increasing from 25.50 to 26.0. 6.

5. Using the *SDT* as a Pre-post Test to Measure the Spatial Abilities of Multiply-Handicapped Adolescents

Henn (1990) examined the question whether an integrated approach to teaching can have a significant effect on the understanding of horizontal, vertical, and depth relationships by multiply-handicapped students.

Subjects included 24 racially mixed retarded students, ages 16 to 21, from rural, suburban, and urban areas in three New York counties. Some students were nonverbal. The Drawing from Observation subtest served as a pre-post measure. Six lesson plans were designed by Henn to develop spatial awareness and elicit spatial thinking. Each lesson contained a movement activity accompanied by music, an art activity, and a closing activity. Although Henn designed the curriculum, the teaching was implemented by Henn and a Movement Specialist. Scoring was done blindly by Henn and another Certified Art teacher. Responses to the drawing task were coded so that the judges did not know which student produced what drawing, nor whether a drawing was a pretest or posttest.

To determine interscorer reliability, a Pearson correlation coefficient was computed. Correlations were .95 for horizontal relationships, .86 for vertical relationships, .and .84 for relationships in depth. In addition, a correlation of .92 was found for combined gains on the three variables.

The post-test scores for all three criteria were significantly higher than the pretest scores. The combined pretest mean was 7.88, the combined post-test mean was 14.12. This difference yielded a t-test value of -2.96 which has a probability of .0058. These findings seem to indicate that the teaching approach enhanced understanding of the three spatial concepts to a highly significant degree, and that the *SDT* was effective as a pre-post measure.

Relationships Between the *SDT* and Traditional Tests

6. Correlations Between *SDT* Scores and Scores on 6 Traditional Tests

In addition to the art therapy program, the National Institute of Education Project (1980) examined the relationship of the *SDT* to six traditional tests of intellligence or achievement. They incuded the *Canadian Cognitive Abilities Test*

(CCAT), The Metropolitan Achievement Test (MAT), The Otis Lennon School Ability Test, The SRA Math Achievement Test, The Iowa Test of Basic Skills (Composite), and The WISC Performance IQ which was used in testing deaf children.

Although significant relationships were found between the *SDT* and these traditional tests, the reliability coefficients were low, as shown in Table 11. The correlations with Drawing from Imagination were modest while correlations with Drawing from Observation were significant only with the Iowa Composite Test. Thus the relationships between these tests and the *SDT* are only moderate.

The traditional tests are heavily weighted with verbal items which do not appear at all on the *SDT*. On the other hand, the *SDT* taps cognitive skills that are not included on these tests. All the instruments assess intellectual ability, but use different assessment techniques, and emphasize language and visuo-spatial cognitive skills to different extents.

TABLE 11. *Relationships Between Scores on the SDT and Scores on the CCAT, Otis Lennon, WISC Performance IQ, MAT Reading, and SRA Math*

	Predictive Drawing			Dr fr Observation		Dr. fr Imagin.	
	N	*r*	*p*	*r*	*p*	*r*	*p*
CCAT	25	.33	ns	.05	ns	.50	.01
Otis Lennon	99	.30	.01	.05	ns	.39	.01
WISC Perf.	65	.33	.01	.16	ns	.37	.01
MAT Reading	76	.32	.01	.03	ns	.31	.01
SRA Math	65	.36	.01	-.15	ns	.37	.01
Iowa Comp.	20	.11	ns	.55	.01	.44	.05

What can't be explained by correlations with these traditional tests can be explained by other cognitive strengths not measured by these tests. Joey, was not alone in having low scores on a traditional test and high scores on the *SDT*. In Predictive Drawing, only 18 of 136 children received the highest possible scores, and 8 of the 18 had IQ scores ranging between 50 on the Stanford Binet, and 140 on the *Draw A Man* test. Their ages ranged between 10 and 13.

The *SDT* has been presented to audiences of teachers and other professionals. Without fail, some confuse spatial relationships in drawing from observation, or draw houses perpendicular to the slope, or lines parallel to the sides of the tilted bottle.

How can this finding be explained? The obvious answer, lack of talent in art seems inadequate because the drawing tasks call for more than art skills. It may be instead, that adults who say they cannot draw a straight line have difficulty in processing spatial information. They may have subtle cognitive dysfunctions easily overlooked because our schools emphasize verbal skills, and it does not matter if students cannot draw. By the same token, subtle cognitive strengths may also be escaping detection. It may well be important to to identify and evaluate these strengths if they can be used to assist students with language dysfunctions to acquire concepts usually acquired verbally.

The results lend support to the hypothesis that the *SDT* measures cognitive skills through the use of drawings rather than language. The Predictive Drawing subtest is based on the theory that it measures ability to predict and represent concepts of sequential order, horizontality, and verticality, as stated in Chapter 2. The Drawing from Observation subtest is based on the theory that it measures ability to represent spatial relationships in height, width, and depth. The Drawing from Imagination subtest is based on the theory that it measures levels of ability to select, combine, and represent through images instead of words. These cognitive abilities appear relatively independent of language-impairment and verbal-analytical thinking, and to some extent independent of age.

The findings support the premise that the *SDT* can be used to identify cognitive skills in children with known language deficiencies such as the deaf, language-impaired, learning disabled, and disadvantaged as well as adults who who cannot communicate well verbally. These results also explain why we have found unexpected cognitive strengths in some children when using the *SDT* - strengths which do not appear on other tests.

7. Correlations Between the Scores of 70 Learning Disabled and Non-Disabled Adolescents on the *SDT* and the *Bender, Draw A Man, WAIS Verbal, and WAIS Performance IQ Tests*

Moser (1980) administered the *SDT* to 70 learning disabled and non-disabled adolescents and compared mean scores. The learning disabled group received lower scores than the control group to a degree significant at the .001 level of probability on the *SDT*, and on the *Goodenough Harris Draw a Man* test at the .05 level, as shown in Table 12.

These findings indicate that learning disabled and non-disabled adolescents who would be expected to differ in cognition, do differ on the *SDT*.

Moser also compared the *SDT* scores of her learning disabled subjects with their scores on four other tests. She found significant correlations between *SDT* total and subtest scores and scores on the *Wechsler Adult Intelligence Scales (WAIS) Performance IQ* test and the *Goodenough-Harris Draw A Man* test at the .01 and .001 levels. Negative correlations were found between the *SDT* and the *Bender Visual Motor Gestalt, and the WAIS Verbal* scores, as shown in Table 13.

TABLE 12. *Correlations Between Scores on the SDT and Draw A Man Tests by 36 Learning Disabled Adolescents and 34 Control Group Adolescents*

Variable	Experimental Mean (n = 36)	S.D.	Control Mean (n = 34)	S.D.	t	p
Predictive Drawing	3.28	1.02	4.65	.63	−6.98	.001
Drawing from Ob.	3.93	1.20	4.9	.30	−4.84	.001
Drawing from Imag.	2.48	1.30	3.63	1.14	−4.01	.001
Total	3.20	.95	4.39	.54	−6.65	.001
Draw-A-Man	40.26	10.59	46.95	9.50	−2.45	.05

TABLE 13. *Correlation Matrix between Scores on the SDT and Draw A Man, Bender, and WAIS Performance Tests by 36 Learning Disabled Adolescents*

	Variable	1	2	3	4	5	6	7	8
(1)	Drawing from Imagination	1.00							
(2)	Drawing from Observation	.45**	1.00						
(3)	Predictive Drawing	.62***	.22	1.00					
(4)	Silver Test Total	.88***	.71***	.75***	1.00				
(5)	Draw-A-Man	.75***	.31*	.62***	.72***	1.00			
(6)	Bender	−.59***	−.17	−.42**	−.50***	−.37**	1.00		
(7)	WAIS (Verbal)	−.04	.18	−.01	.02	−.12	−.01	1.00	
(8)	WAIS (Performance)	.59***	.37**	.50***	.60***	.60***	−.45**	.01	1.00

* p = .05
** p = .01
*** p = .001

The lack of correlations with the *WAIS Verbal IQ* supports the theory that the *SDT* does not measure verbal ability. Similarly, the lack of correlation with the *Bender* supports the theory that the *SDT* measures conceptual skills and creativity. The *Bender* asks examinees to copy 9 abstract designs and as stated in its title, is a measure of visual-motor skills whereas the *SDT* gives copying its lowest score and originality its highest. In presenting the *WAIS Verbal Scale*, the examiner reads questions aloud and examinees respond orally, thus requiring auditory-verbal input and verbal output. In presenting the *SDT*, the examiner can bypass language with pantomime, and examinees receive and respond to directions nonverbally through

images. Although the *Drawing from Imagination* task also asks for verbal responses, it can be scored without them.

Conversely, positive correlations between the *SDT*, *The Draw A Man* and the *WAIS Performance Scale* suggest that these measures tap similar abilities and assess similar constructs. Since no correlations were found between the *SDT* and the *Bender* and the *WAIS Verbal*, they seem to assess different constructs.

Chapter 6 presents additional comparisons between groups including age and gender differences and differences between hearing-impaired, learning disabled, dyslexic, and unimpaired children and adolescents.

8. Correlations Between the Scores of 75 Children on the*SDT* and the *SRA Reading Test*

Hayes (1978) administered the *SDT* to 75 children with no known disabilities. They included first-, second-, and third-graders from low to middle income urban backgrounds. Scores of the first-graders were compared to their scores on the *Informal Reading Inventory*. Scores of the second- and third-graders were compared with their scores on the *SRA Reading Achievement Test, Form F, Primary II.*

In all three grades, significant correlations were found between Drawing from Imagination subtest scores and reading achievement scores, as shown in Table 14.

TABLE 14. *Correlations Between Scores on the SDT Drawing from Imagination Subtest and SRA Reading Achievement Test*

Grade	*n*	*r*	*p*
1	25	.945	.05
2	25	.657	.05
3	25	.668	.05

The relationship between the SDT and reading ability was stronger for girls than boys in the 2nd and 3rd grades. The correlation between Drawing from Observation and reading achievement was significant for third graders only. The correlation between Predictive Drawing and reading achievement was significant for first graders only.

9. Correlations between the Scores of 15 Adolescents on the *SDT* and the *SRA Survey of Basic Skills*

Foster (1989) administered the *SDT* to 15 students, ages 13 and 14, comprising one half of her 8th grade class in a rural public school in Nebraska. Since the class had previously been divided for periods of music and art, Foster administered the *SDT* to students attending the art period, then sent the test booklets to the author for scoring. In a sealed envelope, she also sent their scores on the *SRA Survey of Basic Skills Ability*. The sealed envelope and the *SDT* scores were sent to a psychologist for analysis.

Significant correlations were found between the *SRA* scores, total *SDT* scores, and two subtest scores: Predictive Drawing and Drawing from Imagination. No significant correlations were found between the *SRA* and Drawing from Observation subtest, as shown in Table 15.

TABLE 15. *Correlations between Scores on the SDT and SRA Survey of Basic Skills Ability Tests by Adolescents with No Known Disabilities*

Subtest	Mean	SD	*r*	*p*
Predictive Drawing	11.4	1.8	0.52	0.05
Drawing from Observation	12.2	2.4	0.51	n.s.
Drawing from Imagination	9.8	2.5	0.68	0.01
Total	33.4	5.0	0.76	0.01
SRA	104.7	9.8		

Evidence of Changes with Age and Normative Data

To develop norms so that the test performance of particular individuals may be compared with performances by others of the same age or grade level, the *SDT* was administered to 547 students in grades 1 to 12 in rural, urban, and suburban schools. These students came from 13 schools in low to middle socioeconomic neighborhoods, in six state and in Canada, as shown in Table 16. The SDT was administered by teachers and art therapists who volunteered to validate the test and develop norms by giving the test to the children or adults with whom they worked.

About 700 children with various disabilities have also been tested. Because each child seemed to have a unique constellation of abilities and disabilities, it was felt that norms would not be useful.

The *SDT* was also normed on 77 adults. Approximately 250 adults have taken the test during workshops or lectures in Idaho, Masachusetts, Missouri, New York, and Quebec, Canada. They included undergraduate and graduate students, social workers, therapists, teachers, and parents of handicapped children. From

this group, a random sample of 20 subjects was selected. In addition, the normative data included a class of college freshmen in Nebraska, a class of graduate students in Wisconsin, and a college audience in upstate New York.

TABLE 16 *Descriptive Data for Normative Samples of 547 Students in Grades 1 to 12*

School	Grades	N	Location	Socio-Econ	Admin By	Scorer
A	1,2,3	65	N.Y.suburban	low-mid	RS	RS
B	2	25	Ont. rural	low-mid	teacher	RS
C	2,3,5	122	N.Y.urban	low-mid	AT	AT
D	2,3,4	90	N.Y.urban	low-mid	teacher	teacher
E	3	24	NE urban	low-mid	teacher	teacher
F	3,4	49	N.Y. suburban	middle-high	RS	RS
G	4,5,6	60	N.Y.suburban	low-middle	RS	RS
H	4	20	PA	middle	AT	AT
I	4	21	N.J.	middle	teacher	teacher
J	5	28	CA	middle	AT student	AT
K	8	15	NE rural	low/middle	teacher	teacher
L	10	16	PA	middle	AT	AT
M	12	36	N.Y.urban	low	AT	AT

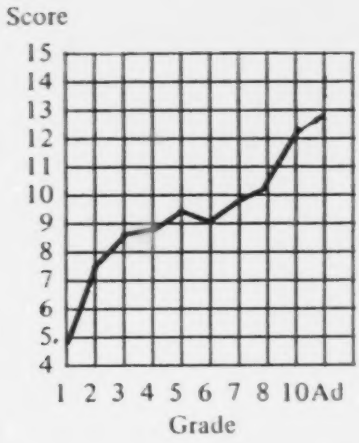
Normative data are presented in Appendix B. Mean scores on the *SDT* have been calculated so that rough estimates of achievement can be made. Individual scores above the mean scores indicate above average performances, scores below the mean scores indicate below average performances.

The scores increase with age showing gradual improvement through the school years (see Table 17). Where reversals occur in the prevailing upward trend, they are within chance limits. Although the samples sizes are small, it is hoped they can be enlarged, and that readers interested in collecting data will contact the author.

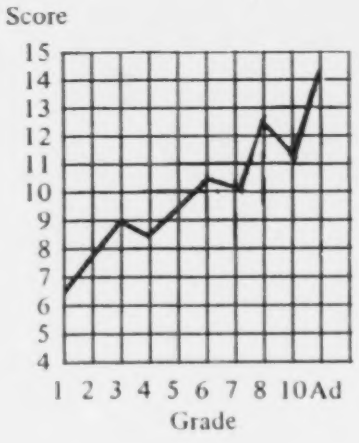
Appendix B also contains conversions from *SDT* raw scores to *t*-scores and percentile ranks for subtests and total scores.

TABLE 17. *Mean Scores as a Function of Grade Level in SDT Responses*

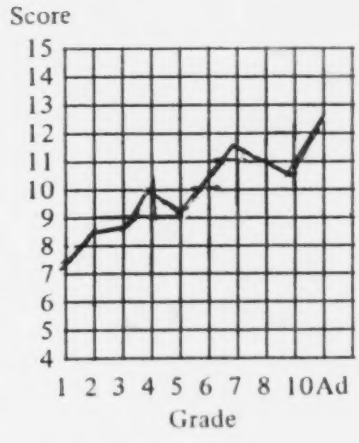
A. Predictive Drawing



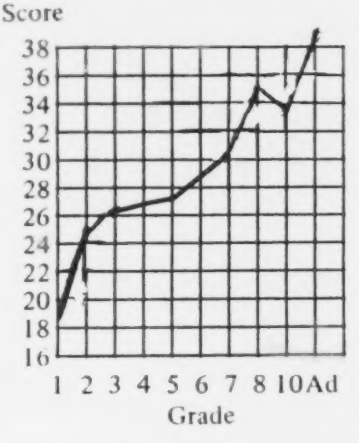
B. Drawing from Observation



C. Drawing from Imagination



D. Total Score



Chapter 6

1990-1996 Studies Showing Validity

Is there evidence that the *SDT* can be used to assess age and gender differences in the cognitive and emotional content of response drawings? Is there evidence that it can be used as a diagnostic tool in clinical art therapy, or to assess differences between deaf, hearing, and learning disabled subjects? This chapter addresses these and other questions in 11 studies conducted after the second edition was published in 1990.

1. Assessing Age and Gender Differences in the Emotional Content of Drawings

According to Gilligan, Ward, and Taylor (1988), gender has a profound effect on moral judgment and on ways of organizing thoughts and feelings. The masculine mode is based on concepts of self-sufficiency; the feminine mode, on care and responsibility to others. The authors based their observations on verbal expression.

Is there support for these observations in responses to the Drawing from Imagination task? Do boys tend to draw autonomous subjects? Do girls tend to draw subjects interacting with others? These questions were addressed in a study which also asked whether children tend to identify with the subjects of their drawings by choose principal subjects the same gender as themselves (Silver, 1992).

The subjects included 261 children, 145 boys and 116 girls, ages 7 to 10, residing in New Jersey, New York, Nebraska, Pennsylvania, and Canada. They attended second, third, and fourth grades in suburban and urban public and private schools.

The genders of principal subjects in their drawings were compared with genders of the children who drew them. Most boys drew pictures about male subjects; most girls, about female subjects. The *chi square* was used to determine whether the differences were significant. Gender differences emerged, significant at the .001 level of probability.

In drawings about autonomous subjects, boys outnumbered girls but the differences were not significant. In drawings about interpersonal relationships,

girls outnumbered boys, but again the differences were not significant. Proportionally twice as many boys (28%) as girls (14 %) drew pictures about autonomous subjects enjoying themselves. Even more boys (19%) than girls (5%) drew pictures about assaultive relationships. Virtually no gender differences were found in drawings about caring relationships (16% girls, 14% boys).

2. Age and Gender Differences in Attitudes Toward Self and Others

A subsequent study (Silver, 1993b) also addressed the questions whether males and females tend to choose same-gender subjects and express characteristically different attitudes, and if so, whether age differences are found. Subjects included 531 respondents in five age groups: children ages 7-10, younger adolescents age 13-16, older adolescents ages 17-19, younger adults ages 20-50, and older adults ages 65 and older.

As in the previous study, proportionally more females than males drew pictures about relationships (61% females, 56% males), and more males than females drew pictures about solitary subjects (44% males, 39% females), but these differences did not reach statistical significance. When attitudes toward self and others were examined, however, significant differences were found.

Males expressed positive attitudes toward solitary subjects, negative attitudes toward relationship. These differences were significant at the .001 level of probability (X^2=46.971, $p < .001$). Females expressed positive attitudes toward solitary subjects, both positive and negative attitudes toward relationships. These findings, too, were significant at the .001 level of probability (X^2 =25.32, $p < .001$)

Males showed significantly higher frequency than females in drawing about assaultive relationships ($X^2(1)$=9.38, p <.01). However, age and gender differences interacted ($X^2(4)$=13.07, p <.05) resulting in a significant age variability in assaultiveness for females but not for males. The proportion of older females who drew assaultive fantasies exceeded the proportion of older men who did so, as well as the proportion of all other female age groups.

The converse age and gender interaction was found for caring relationships ($X^2(4)$=12.52, p <.05). Whereas females showed significantly higher frequency of caring relationships across age groups, males showed signficant age variability. The proportion of younger men who drew pictures about caring relationships exceeded the proportion of younger women who did so, as well as the proportion of all other male age groups.

Respondents who drew human subjects, chose subjects the same gender as themselves to a degree significant at the .001 level of probability. This tendency peaked in childhood and reached its lowest level among adults. The decline continued among older women (19%) but reversed among older men (54%), a proportion almost equal to that found in the samples of boys. Genders were clearly indicated in responses by children and adolescents but sometimes unclear in responses by adults, particularly in the drawings of older women.

3. Assessing the Emotional Content of Drawings by Older Adults

A subsequent study expanded the previous study by examining more closely the responses of 59 adults over age 65, 28 men and 31 women living independently in their communities (Silver, 1993c). Although the sample was too small for statisical analysis, more older women than any other age or gender group drew sad or helplesss solitary subjects (1 point). On the other hand, more older women than any other age or gender group drew pictures about active solitary pleasures (5 points).

In drawings about relationships, more older men than older women, or any other age or gender group, drew fantasies about stressful relationships (2 points). Older men expressed attitides toward relationships that were proportionally more negative than any other male age group. Older women expressed more negative attitudes toward solitary subjects than any other age or gender group. Although negative attitudes predominated among older adults, they also used humor more often than any other age group. Humor was used more often in responses by older men (39%) than in responses by older women (16%). The humor of adolescents tended to be aggressive, making fun of others, whereas the humor of older adults tended to be self-deprecating, directed toward themselves. Suggesting resilience in s pite of low self-esteem, and the ability (or wish) to survive in spite of adversity.

4. Comparing *SDT* Scores of College Men and Women in Australia

A study by Hunter (1992) found women superior to men, as measured by the *SDT*, one of five test instruments used in the study. Subjects were Australian college students, 128 women and 65 men, ages 15 to 53. The men predominated in engineering and construction courses; the women, in office and education courses.

Hunter distinguished between two kinds of spatial thinking: restricted and unrestricted. Restricted spatial thinking was defined as solving problems which have correct solutions, elicited in response to the *Drawing from Observation* and *Predictive Drawing* subtests. Unrestricted spatial thinking was defined as solutions satisfying to the examinee, creative solutions rather than correct answers, elicited in responses to the *Drawing from Imagination* subtest. Eleven variables, derived from the three subtests, were examined using the mean ratings of two scorers as subject data and a multivariate analysis of variance design.

Gender differences were found in both restricted and unrestricted spatial thinking. Women appeared to perform better on unrestricted tasks requiring free responses as well as on restricted tasks which required the definition of visual-spatial relationships in height, width, depth, and to some extent sequential order.

The contrast of gender using the multivariate set of DVs was significant ($F(1,150)=5.8$, $p < .001$). The asssociated univariate F test for Drawing from Imagination was significant (F (1,150)=13.3, p .< 001, Eta 2=.08). In addition, the associated univariate F test for Drawing from Observation was significant ($F(1,150)=7.7$, p <.006, Eta2=.05.

Drawing from Imagination accounted for 33.3% of the variance (eigenvalue + 3.7) defined by the variables loading .81 or above (ability to select, combine, represent, and language). The variable Projection which loaded .53 was not found significant. Predicting Horizontality loaded .73 and Predicting Verticality loaded .71. Drawing from Observation accounted for 17.6% of the variance with loadings of .78 or higher (height, width, and depth).

Hunter observed that these findings are consistent with the theory that cognitive skills evident in verbal conventions can be evident also in visual conventions, and that gender differences should be considered in developing course methodologies in order to facilitate learning.

5. Comparing *SDT* Scores of College Men and Women in the USA

Hunter's findings prompted a review of earlier responses to the *SDT* for evidence of gender differences or similarities. Responses by 26 men and and 26 women were reexamined. Subjects included a class of college freshmen in Nebraska, and a college audience in upstate New York. Mean age for the group was 26. The test was administered and scored by teachers who had participated in the studies of reliability or validity for the 1990 edition of the *SDT*.

T-Tests were conducted on all spatial measures. There were no gender differences on almost all spatial abilities. Gender differences were found on two non-spatial measures. Males scored higher in sequencing (4.58 men, 3.69, women) t-value = -2.49, p <.05) and in ability to represent (4.19 men; 3.50 women) t-value = 2.39, p <.05). No gender differences were found in Horizontality, Verticality, or in three-dimensional spatial relationships.

6. Comparing *SDT* Scores of Male and Female Adolescents

Responses by normal students ages 12 to 15 were also reexamined for gender differences and similarities in Drawing from Observation and Predictive Drawing The subjects included 33 girls and 33 boys attending three public schools in Nebraska, New York, and Pennsylvania.

No significant differences were found. Although female mean scores (3.70) were higher than male scores (3.03) in Front-back relationships, the probability was less than .10 and did not reach significance. The girls received higher mean scores in four of the six tasks (Horizontality, Verticality, Above-below, and Front-back relationships) while the boys received higher mean scores in Left-right and Sequencing, but these differences did not reach significance. The girl's scores tended to be consistent while the boys' scores showed variability, particularly in Sequencing and Left-right relationships.

The findings of the last three studies raise questions about the claim that there is consensus on male superiority (McGee,1979), and suggest that further investigation of gender differences in spatial ability would be worthwhile.

7. Using the *SDT* as a Diagnostic Tool in Clinical Art Therapy

Horovitz-Darby (1991) examined the role of clinical art therapy with deaf children and their families. Treatment was based on an art therapy diagnostic assessment which included the administration of four tests: The Diagnostic Art Therapy Assessment (*DATA*, Horovitz-Darby, 1987); Kinetic Family Drawings (Burns & Kaufman, 1972); the House Tree Person test (Buck, 1950); and the *SDT*. A case study of a 10-year-old boy found concurrence between the two tests that yielded quantified information - the *DATA* and the *SDT*.

Green in Horovitz (1995) used the same group of tests in a clinical program which found concurrence between the test instruments in working with a 14-year -

old girl who performed at the 7-9 and 9-12 year levels as measured by the *DATA*. As measured by the *SDT*, she scored 27 out of a possible 45 points, performing at the 24th percentile. In Drawing from Imagination, she drew a snake "scaring and killing" a cat. scored 1 point. Based on responses to the four tests, Green concluded that her client was functioning at the 9-12 year level, and was depressed, based on on her response drawing as well as a long history of abuse and neglect.

Carrion (in Silver & Carrion, 1991) used the *SDT* in an inpatient psychiatric program to obtain quantified material as part of a battery of tests that provided qualitative material. He found that information about a patient's cognitive resources may modify some impressions and clinical assumptions. To illustrate, he cited the example of a patient unable to draw a sequence, suggesting a deficit in ability to organize stimuli meaningfully, rather than resistance to disclosure. Silver discussed using the *SDT* in schools to identify children at risk for depression.

Allessandrini, Dupas, and Bianco (1995), art therapists in Brazil, have translated the *SDT* into Portugese and have tested about 1700 students in randomly selected public and private schools. Their findings are not yet available.

8. Comparing *SDT* Scores of Deaf and Hearing Girls and Boys

It is often assumed that deaf children lag behind children with normal hearing in cognitive abilities, and that females lag behind males in spatial abilities. It has even been claimed that male superiority in spatial thinking has been confirmed and is not even in dispute (Moir & Jessel, 1992).

The *SDT* was designed initially to tap the cognitive abilities of children like Charlie, as discussed in Chapter 1. It was theorized that children with language- and hearing impairments would equal unimpaired children in spatial skills, but fall behind in sequential and verbal skills.

To test these theories, responses to the *SDT* by 27 deaf and 28 hearing children, ages 9 to 11, were examined and their test performances compared.

Procedures

The hearing-impaired subjects included 13 girls and 14 boys in an urban non-residential school for deaf children in New York. They included all the children in the fourth grade who had responded to the *SDT* as part of the National Institute of Education project discussed in the previous chapter. Their scores on the *WISC* Performance Scale ranged between 72 and 130. One girl and one boy were severely impaired with multiple handicaps; another boy was "language disordered."

The hearing subjects included 14 girls and 14 boys attending two public elementary schools. They were matched in age and selected at random from responses to the *SDT* administered by a classroom teacher in New Jersey and an art therapist in Pennsylvania, and scored by teachers or art therapists.

Results

Predictive Drawing. No significant differences were found between deaf and hearing children, or between girls and boys, in horizontal orientation or in ability to sequence. The deaf children received significantly higher scores than the hearing children in vertical orientation ($F(1,51)=14.34$, $p<.001$). Mean scores were 3.13 and 2.00 respectively, as shown in Table 18.

Drawing from Observation. No significant differences were found between deaf and hearing children, or between genders, in representing Left-right, Above-below, or Front-back relationships.

Drawing from Imagination. The girls received higher scores than the boys in ability to select (3.54 vs 3.04) to a degree significant at the .05 level ($F(1,51)=5.49$, $p < .05$). No other gender differences were found. This finding is shown in Table 19.

The hearing children received higher scores than the deaf children in ability to select ($F(1,51)=12.85$, $p < 001$, ability to combine ($F(1,51)=57.66$, $p <.000001$), and ability to represent ($F(1,51)=30.99$, $p < .000001$). The means were 3.68 vs 2.90 for selecting, 3.93 vs. 1.98 for combining, and 3.89 vs. 2.27 for representing. This finding is shown in Table 20.

Observations

It was surprising to find the deaf children superior in Vertical orientation. Only four of the 55 children drew vertical houses, and three of the four were deaf. This suggests they had somehow discovered that houses remain vertical when cantilevered or supported by posts, a discovery that seems to call for visuo-spatial thinking.

No significant differences were found in the four remaining spatial abilities. This finding supports the theory that hearing-impaired children can be expected to equal hearing children in visuo-spatial abilities, as measured by the *SDT*. The results also have support in a study by Craig and Gordon (1989) who found the cognitive task performance of deaf high school students above average for the visual and spatial skills measured by the Cognitive Laterality Battery (Gordon, 1986), but below average for sequential skills. In the present study, however, the

deaf children equalled the hearing children in ability to sequence, as measured by the Predictive Drawing subtest.

TABLE 18. *Comparing Scores of Deaf and Hearing Children in Ability to Predict and Represent Verticality.*

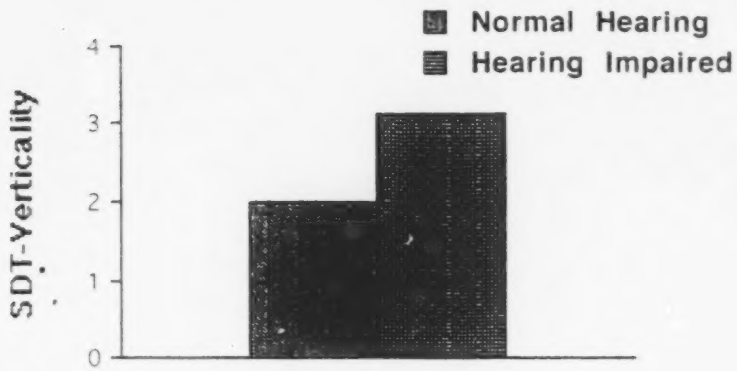


Table 19 *Comparing Scores of Girls and Boys in Ability to Select.*

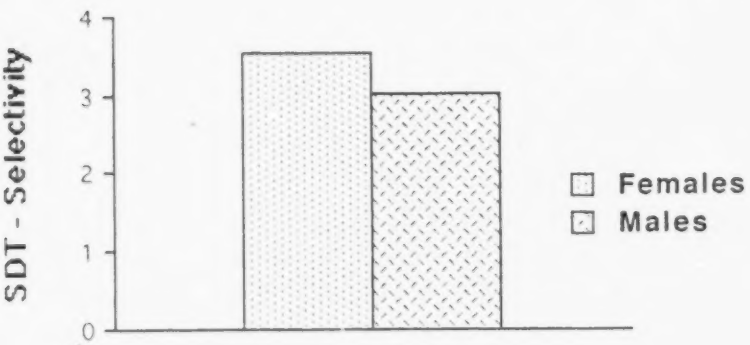
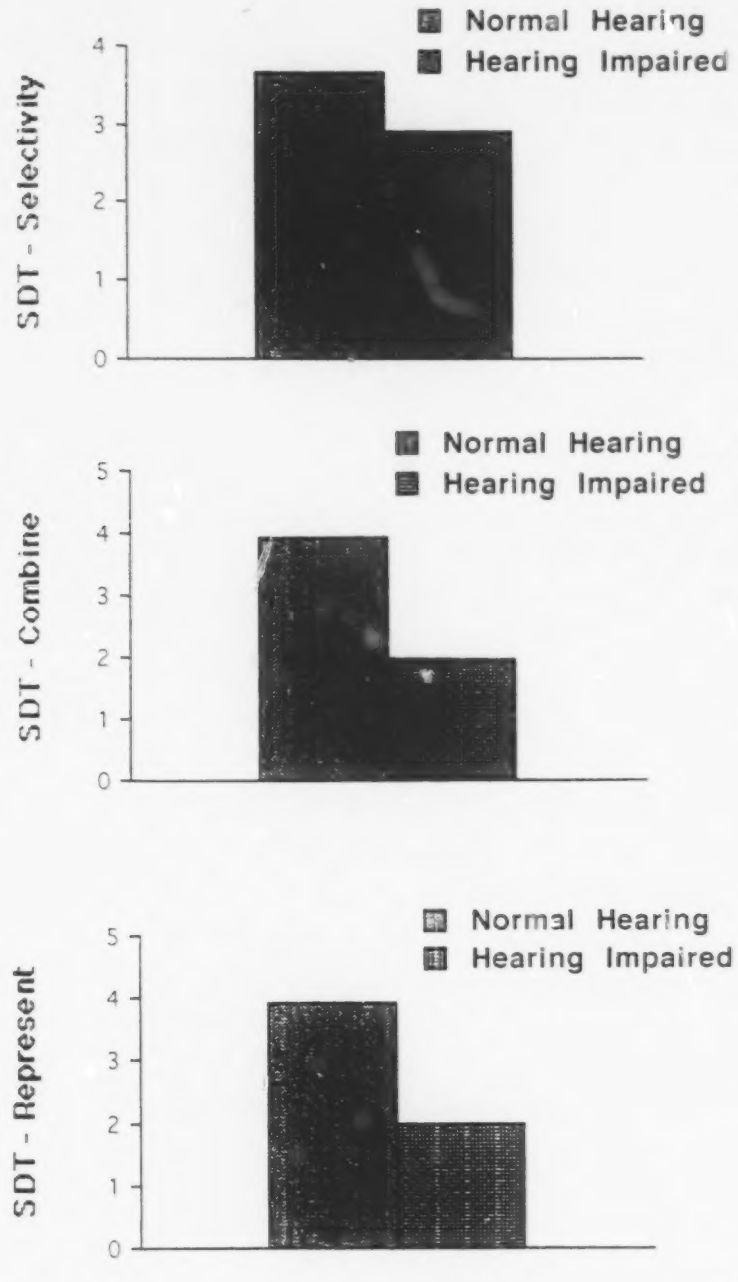


FIGURE 20. *Comparing Scores of Deaf and Hearing Children in Ability to Select, Ability to Combine, and Ability to Represent.*



The significantly lower scores of deaf children in Drawing from Imagination suggest that selecting images and combining them into drawings does not parallel the mental operations of selecting words and combining them into sentences. It may be that these mental operations cannot be separated from language skills. On the other hand, it may be that the deaf children lagged behind because they had less experience in selecting, combining, and representing because of language deficiences. If so, additional experiences in drawing from imagination may lead to improvements that transfer to language skills.

Pollio and Pollio (1991) suggest that assessment should be tied to intervention. Educators of deaf children may find useful the intervention techniques for developing cognitive skills in Chapter 7. Other developmental techniques have been described by Williams and Wood (1977) and Anderson, (1992, 1993).

It was also surprising to find no significant gender differences in spatial abilities because of many reports of male superiority in the Piagetian task of liquid horizontality. In addition, the girls received significantly higher scores than the boys in ability to select.

The findings of this study support the theory that the *SDT* can be effective in assessing gender differences and similarities as well as cognitive strengths and weaknesses of hearing-impaired children.

9. Comparing *SDT* Scores of Learning Disabled, Deaf, and Unimpaired Girls and Boys

This study extended the previous study by adding a sample of 28 learning disabled children (manuscript submitted for publication). The data were analyzed by using ANOVA and LSD tests to determine which groups differed on which measures.

The deaf children scored higher in Vertical orientation than either the learning disabled or unimpaired children at the .05 level of probability. No significant differences were found in Sequencing or Horizontality.

The unimpaired children and deaf children scored higher than learning disabled children in representing Left-right relationships. In representing Above-below relationships, the unimpaired children scored higher than the learning-disabled children and no significant differences were found in representing Front-back relationships.

The unimpaired children scored higher than either hearing-impaired or learning-disabled children in ability to Select, Combine, and Represent. The girls scored higher than the boys in Selecting and in Combining whereas the boys had no significantly higher scores.

These findings amplify the evidence found in the previous study and support the theory that the *SDT* can be effective in assessing and comparing the cognitive strengths and weaknesses of hearing-impaired, learning disabled, and unimpaired girls and boys.

10. Comparing SDT and CAT Scores of Children with Learning Disabilities, Dyslexia, and No Known Disabilities

Hiscox (1990) hypothesized that learning disabled children would fall within the normal range on IQ tests that were not based on language. She administered two tests: the *SDT* and the California Achievement Test *(CAT)* including Verbal, Quantitative, and Nonverbal Batteries.

Subjects included 14 learning disabled, 14 dyslexic, and 14 normal children in the third, fourth, and fifth grades of three public schools and one private school in California. Selection of the dyslexic group was based on poor performances on the Scott Fresman Oral reading Inventory.

The *CAT* and *SDT* data were analyzed by using a One Way Analysis of Variance design. Results indicated that each group performed differently (*CAT* verbal Battery, $F=40.97$, $df= 2,39$ $p < .0001$), suggesting that the differences found between groups were real and could not have been due to chance. An examination of reliability showed a high level of scorer agreement; ratings varied by only 1-3 points.

The results supported the hypothesis that learning disabled children would fall within the normal range. On both tests, normal subjects had the highest mean scores (CAT: 121.1; SDT: 30.88). Learning disabled subjects had higher mean scores (CAT: 104.9; SDT: 30.54) than the reading disabled subjects (CAT: 98.1; SDT: 25.64) who performed within the middle range of both groups. The difference in the mean and standard deviation between groups validated the rejection of the null-hypothesis at the .05 level of significance.

11. Comparing the *SDT* and *Draw a Story* Instruments

This study was an attempt to answer the question whether it was negative content in the *DAS* stimulus drawings that elicited strongly negative responses by depressed respondents, or whether it was their tendency toward feelings of sadness and thoughts of death, regardless of the stimuli. As discussed in Chapter 2, a reviewer raised this question, suggesting that negative stimuli would restrict the *DAS* potential for discriminating between depressed and nondepressed respondents.

Five art therapists rated 4 sets of stimulus drawings, two from the *SDT* and two from the *DAS* instruments. They rated each set on a scale from 1 to 5 points, ranging from "not at all likely to trigger negative responses"(1 point), to "extremely likely to trigger negative responses" (5 points). A one-way ANOVA (stimulus set) was conducted on these ratings. No significant differences emerged, as shown in Table 21.

TABLE 21. *Rating the Likelihood of Triggering Negative Responses for SDT and DAS Stmulus Drawings.*

Drawing Set	Mean Scores	SD
A	2.8	.84
B	3.4	.89
C	4.0	1.00
D	3.6	1.14

A and B are the two sets of *SDT* stimulus drawings whereas C and D are the two sets of *DAS* stimulus drawings. A RAO's R MANOVA statistic revealed no significant differences between sets. The mean ratings would be 3.1 and 3.8 respectively. Although non-significant, differences do exist and may be significant with larger numbers of raters.

This finding suggests that the similarities between the *SDT* and *DAS* instruments are still open to some debate. However, the studies of depressed respondents reported on pages 18 and 19 indicate that the *DAS* is able to discriminate between depressed and non-depressed subjects. There seems no reason to doubt that the *SDT* also can be used to screen for depression.

Chapter 7

Developmental Techniques

This chapter ties assessment to intervention by presenting techniques and procedures for developing the concepts assessed by the *SDT*. These interventions were originally developed in a doctoral project (Silver, 1966), then a demonstration project in art education for hearing-impaired children and adults, supported by a grant from the U.S. Office of Education, Bureau of Research (Silver, 1967). They were further developed in the State Urban Education Project (Silver, 1973) and the National Institution of Education Project (Silver et al, 1980) discussed in Chapter 5.

In this approach, art techniques are demonstrated, then students are asked to solve conceptual problems using the techniques. Three procedures are presented below. Others are outlined in Appendix C.

Developing Ability to Sequence Through Painting

Materials: Blue, red, yellow, and white poster paints, palettes (or white paper 12x18"), brushes, and painting knives (or less flexible palette knives or flat sticks); also water dishes, paper towels and sponges for cleaning up, aprons or old shirts for protecting clothes, and newspapers for protecting tables and floors.

Demonstrate mixing a series of tints by placing a dab of white paint on the upper right corner of a sheet of paper, and a dab of blue on the upper left. With the painting knife, mix a series of tints between the dabs from left to right, by adding more and more white to tints of blue.

Then ask your students to put dabs of white and a chosen color in the upper left and right corners of their palettes, then mix a sequence of tints between them. Later, ask them to add the remaining colors to the other corners of their palettes and encourage them to create sequences of pink, purple, orange, and green, both around and within their palettes.

After this introduction, encourage your students to discover and invent colors of their own by painting images or abstractions. Whenever they add more of one color to another, they create a sequence. Later on, provide black paint so that they can discover shades as well as tints. There is no need for additional colors because virtually all can be mixed from red, yellow, blue, black and white.

Developing Spatial Abilities Through Drawing from Observation

Materials: an orange or small ball, cylinders made from rolling and taping sheets of construction paper in different colors and sizes, white drawing paper, and pencils with erasers, felt-tipped markers, or colored chalks.

Place the orange and one (or more) cylinders on a sheet of paper in the center of a round table, or on a low table surrounded by desks and chairs. Place the objects side by side on the paper, one further forward than the other. This arrangement should be below eye level so that the paper base is seen as a plane.

Demonstrate drawing from observation with a quick sketch, then ask children to draw the arrangement, including the paper base. As they finish, ask them to change seats with classmates on other sides of the arrangement, and sketch again. Do not call attention to mistakes. Instead, call attention to spatial relationships, such as, the orange appears to the left of the cylinder and in the foreground from here, but to the right and in the background from over there.

If a child (or adult) has difficulty drawing from observation, sit beside him or her so that you share the same point of view. Then draw the arrangement slowly, calling attention to spatial relationships and the line formed by the back edge of the table which can serve as a frame of reference. Severely handicapped patients may find it helpful to place a hand over yours as you draw.

In later classes, provide other objects to draw from observation. Include portraits of classmates from different points of view and self-portraits while looking in mirrors.

The combination of focusing attention on an arrangement of objects, then drawing the arrangement, without instructions or interruptions, seems to bring about improvement spontaneously. To illustrate, a sequence of three drawings by a language-impaired child is shown in Figure 41.

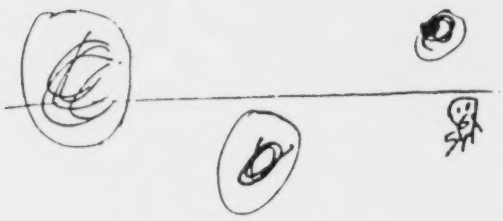
Developing Concepts Through Drawing from Imagination

Materials: stimulus drawings, drawing paper, and pencils, chalk, marking pens, or painting materials.

The stimulus drawings in Form B can be used for developing concepts as well as for amplifying assessment. To develop concepts of class inclusion, cut apart the stimulus drawings and present them as cards grouped in categories of people, animals, and places. Ask respondents to choose cards from different groups and combine their selections into narrative drawings. As they finish drawing, ask them to return the cards "where they belong." Mix the cards and ask respondents to put together those that belong together.

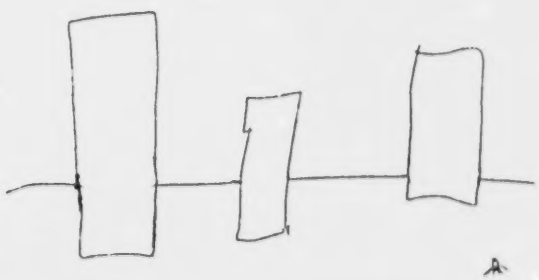
FIGURE 41. *Drawings from Observation by Ben, age 14, expressive language impairments and poor visual-motor coordination.*

Ben's first attempt, drawing an arrangement of three cylinders and a toy bug



Ben's second attempt, drawing a toy landscape.

Ben's third attempt, drawing the same arrangement of cylinders and toy bug.



Developing Concepts Through Modeling Clay

Materials: earth clay (or plasticene), modeling tools (or pencils, paper clips, sticks), wire for cutting clay into lumps, and plastic bags for storing sculpture. In advance, prepare a fist-size lump of clay for each student and for yourself.

Demonstrate rolling a small piece of clay with the palm of your hand on the table surface until it becomes a "ball" or a "snake," then ask the children to make balls or snakes of their own.

To develop ability to sequence, ask them to make larger and smaller balls, or longer and shorter snakes, by adding clay and pinching it off.

To develop spatial abilities, demonstrate the "slab" technique - rolling out clay like dough, cutting it into rectangles, then pinching the rectangles together to make boxes, houses, or other three-dimensional forms.

To develop ability to select, combine, and represent, demonstrate the "brick" technique - forming small blocks of clay and pressing them together to build human or animal forms. Taking a pinch of clay from here and adding it there seems to develop ideas of conservation.

Sonstroem (in Bruner, 1980) devised an effective technique for developing ability to conserve. Ask non-conservers to make two balls the same by pinching off clay from one ball and adding it to the other. When the child is satisfied that they are the same, ask him or her to roll one ball into a snake, then again ask whether they still have the same amounts or whether there is more clay in the ball than in the snake. Ask those who continue giving nonconserving answers, to change the snake back into a ball, and with eyes closed and a ball in each hand, compare them again. After each alteration, ask them to judge amounts of clay and explain their answers. The combination of labeling, manipulating, and reversing seems to lead to discovering that the amount of clay does not change with a change in its shape.

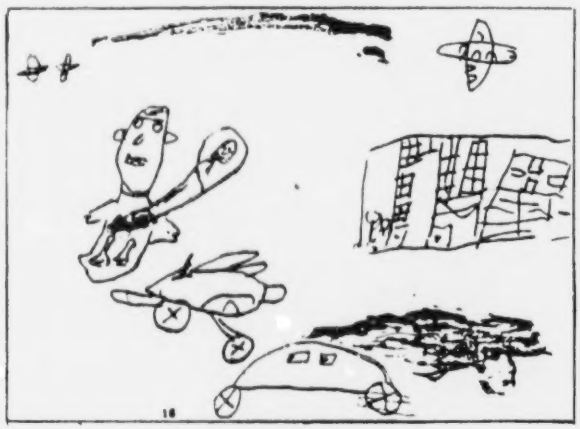
Responses by Burt

Burt, age 13, was one of the children who participated in the State Urban Education project discussed on pages 75-78. According to school records, he had both receptive and expressive language impairments as well as severe hearing loss (75 dB) in his better ear. His IQ was 40, as measured by the Stanford-Binet.

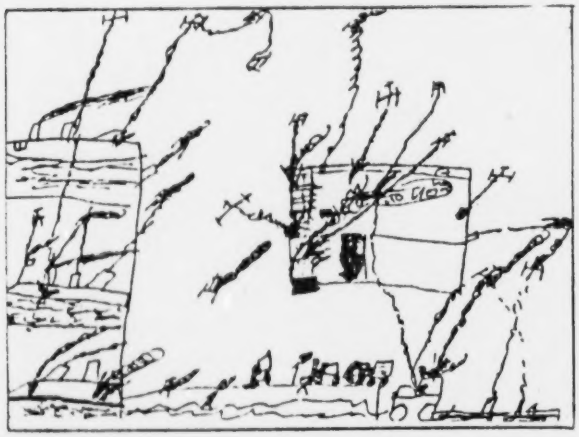
In this project, the art program was provided for one hour per week for 11 weeks. Burt was present at 9 of the 11 art periods. In his first, the Drawing from Imagination task was presented. Burt chose the knife and the man from the Form A stimulus drawings, drew a faceless man with a knife in his stomach, then stopped (Figure 42, #1). Asked if he would like to give the man a face, he said no, then asked how to draw a face. I started to demonstrate on a blackboard, but that was not what he had in mind. He asked me to draw his own likeness, and I did. Burt then added the face to his drawing, the building, and the car. When the period ended, he was so engrossed in drawing that his classroom teacher offered to let him

FIGURE 42. *Sequence of Drawings and Paintings by Burt, age 13, receptive and expressive language impairments and severe hearing loss.*

1. First art class



2. Second art class.



3. Third art class.

stay longer.

The Form A stimulus drawings were again presented in the second art class and again, Burt chose the boy and the knife. He did not draw them, however. Instead, he drew airplanes dropping bombs on ships and buildings, connecting the bombers to their targets with scribbled or dotted lines.

There is a subtle difference between his two drawings. Although both are fragmentary, with jumbled points of view, the subjects in his first drawing are combined at the elementary level of proximity (1 point) but in his second drawing, they are related by dotted lines and scribbles, perhaps representing smoke (2 points).

Painting techniques were demonstrated in the third class. Burt worked hard but his hands trembled and his use of the painting knife made matters worse.

Clay was introduced in the fourth class which started with the Sonstroem technique. Although language was restricted in communicating with Burt, he apparently learned to conserve. He was one of 11 children in the experimental group unable to conserve amounts of liquid on the pretest. In the postest, four of these children were able to conserve and Burt was among them.

After the Sonstroem task, the "slab" technique was demonstrated. Burt made a box with a slit on top, a bank, which he insisted on taking with him when the art period ended.

Other stimulus drawings were presented in the fifth art class. Burt chose a head-and-shoulders sketch of a nurse, then drew her full length, combined with an object of his own invention - crutches, as shown in #4. This painting is organized in both form and content. The nurse is placed on his paper as though its edges served as a frame of reference. in addition, the functional relationship between the nurse and crutches suggests that Burt had a story in mind.

With time to spare, Burt made a second painting, using black paint and touches of red and blue (#5). When he finished painting, he began talking and I wrote his words on the blackboard. He copied them spontaneously on the upper left corner of his painting, "No cars, no people, rain all over, can't walk, get a boat, swim."

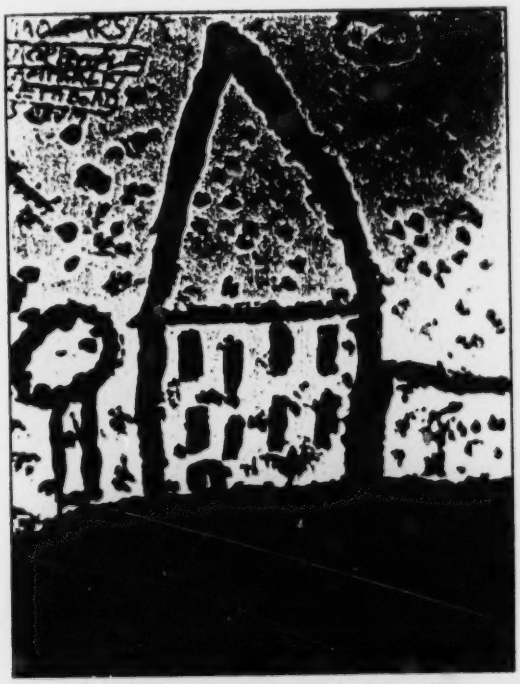
In the sixth art class, Burt painted a nonrepresentational design. His hands no longer trembled and there was no suggestion of frustration in the painting or in his classroom behavior.

The seventh and eighth classess were spent drawing from observation, as shown in #6. In his first drawing (a), Burt missed the front-back spatial relationships. In his second (b), he represented depth but forgot the toy bug. Before his third drawing, he was asked to change places with a classmate on the opposite side of the table. The reversal of spatial relationships apparently caused some confusion because two of his cylinders float above the table (c). In his last drawing from observation, the toy landscape (d) his proportions and spatial relationships are accurate although the trees are above rather than below the back

#4. Burt's first painting in his fifth art class.

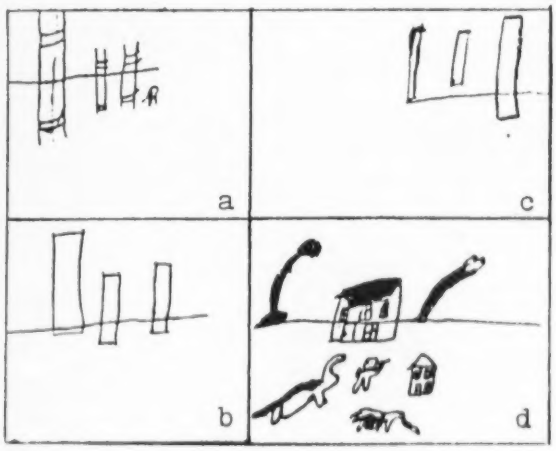
#4. Burt's first painting in his fifth art class.

5. Burt's second painting in his fifth art class

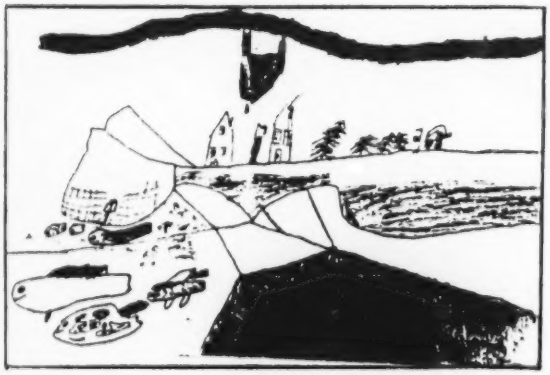


"No cars, no people, rain all over," etc.

#6. Burt's drawings from observation in his seventh and eighth art class.



#7. Burt's drawing from imagination in his ninth and last art class.



edge of the base plane. Since Burt's previous mistakes had not been indicated to him, his gains reflect his own observations and corrections.

In the last two art classes, Burt was free to draw, paint, or model clay as he wished. He chose to paint and explained his painting, #7, as follows: The house (suspended above the landscape) will not fall down. The baby fish is eating its mother. The red lines on her body are his bites. A boy sitting on the dock is watching. Another boy (behind the crosshatching) is in jail. They can't fish because the sign says no. Between them is a fish graveyard."

Before and after the 3-month art program, Burt was assessed by means of a 5-point rating scale consisting of 14-items. Based on this assessment, he progressed from 0 to 5 points in conserving liquids and solids; from 1 to 5 points in selecting, combining, representing, and sequencing; and from 3 to 5 points in concepts of horizontality, having scored 5 points in verticality on the pretest, as shown in Table 25.

These findings were supported by a questionnaire evaluation by his classroom teacher. Before the art program, he scored 1 point "almost never," for ability to select named objects, combine words into sentences, and group objects on the basis of class or function. After the program, he scored 4 points in ability to select, 3 points in ability to combine, and 2 points in ability to group on the basis of class or function. This was a subjective evaluation, of course, but the gains parallel the gains in his post test, and may reflect a transfer of learning from one classroom situation to another. The art procedures and Burt's artwork were included in a second exhibition circulated by the Smithsonian Institution, *Art as Language* (Silver, 1979).

TABLE 25. *Pretest and Posttest Performances by Burt*

Cognitive skills	Pretest October	Posttest January	Changes
1. Conserving liquid	0	5	+5
2. Conserving solids	0	5	+5
3. Conserving numbers	5	5	0
4. Ordering a series	5	5	0
5. Ordering a matrix	3	5	+2
6. Ordering colors	1	5	+4
7. Placing objects in given positions	3	5	+2
8. Horizontal orientation	3	5	+2
9. Vertical orientation	5	5	0
10. Grouping three objects	3	3	0
11. Grouping from an array	5	3	−2
12. Selecting	1	5	+4
13. Combining	1	5	+4
14. Representing	1	5	+4
mean	2.57	4.71	2.17

The art procedures described here are based on the belief that they can serve cognitive, aesthetic, and therapeutic goals concurrently. In this approach, it is important to provide time for quiet reflection, and to prevent interruptions or distractions while respondents are absorbed in work. It is also important to foster mutual respect and to provide an environment where it is "safe to practice watched only by friends."

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SILVER DRAWING TEST BOOKLET

Drawing What You Predict, What You See, and What You Imagine

Rawley A. Silver, Ed.D, ATR-BC

Name.....Age.....Sex.....Date.....

.....

Appendix A

The SDT Test Materials

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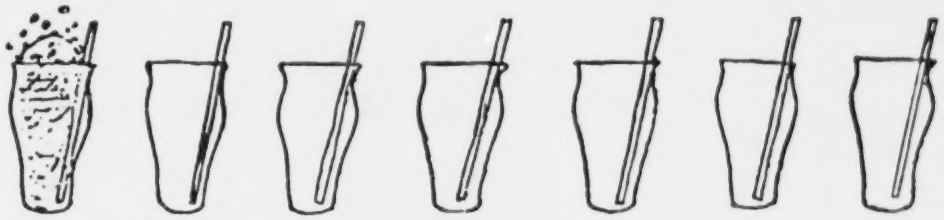
Test Booklets may be ordered from Ablin Press Distributors, 3332 Hadfield Greene, Sarasota, FL 34235 Phone/fax: (941) 377 4512

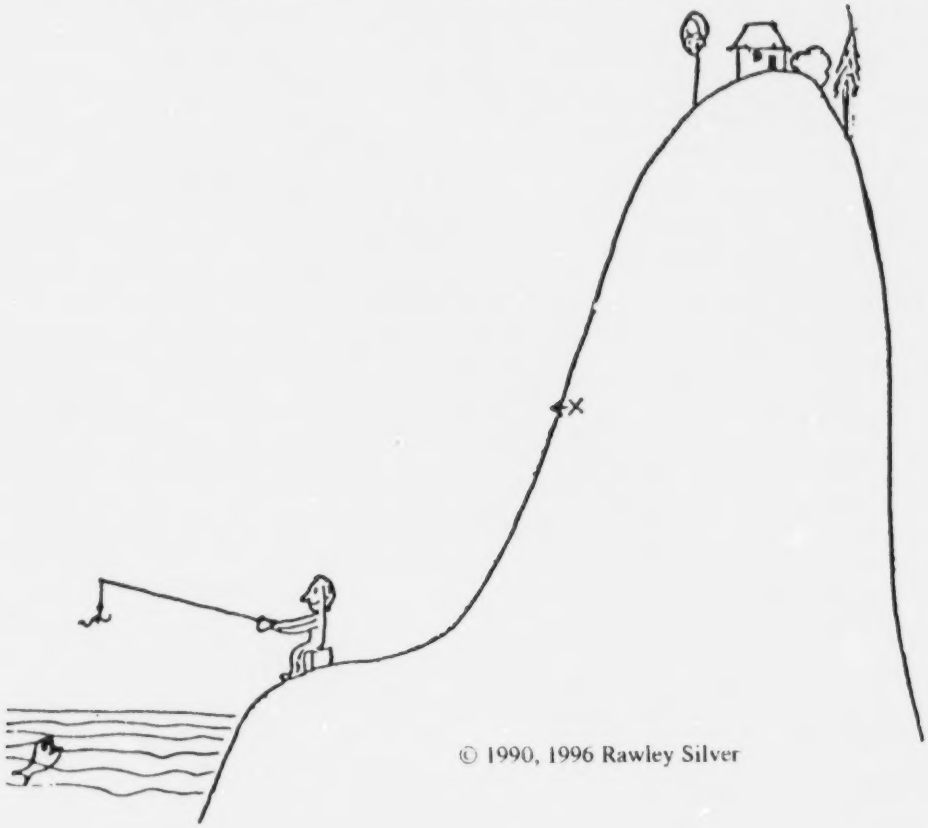
SDT Predictive Drawing

Suppose you took a few sips of a soda, then a few more, and more, until your glass was empty. Can you draw lines in the glasses to show how the soda would look if you gradually drank it all?



Suppose you tilted a bottle half filled with water. Can you draw lines in the bottles to show how the water would look?

Suppose you put the house on the spot marked x. Can you draw the way it would look?



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SDT Drawing from Observation

Have you ever tried to draw something just the way it looks? Here are some things to draw. Look at them carefully, then draw what you see in the space below.

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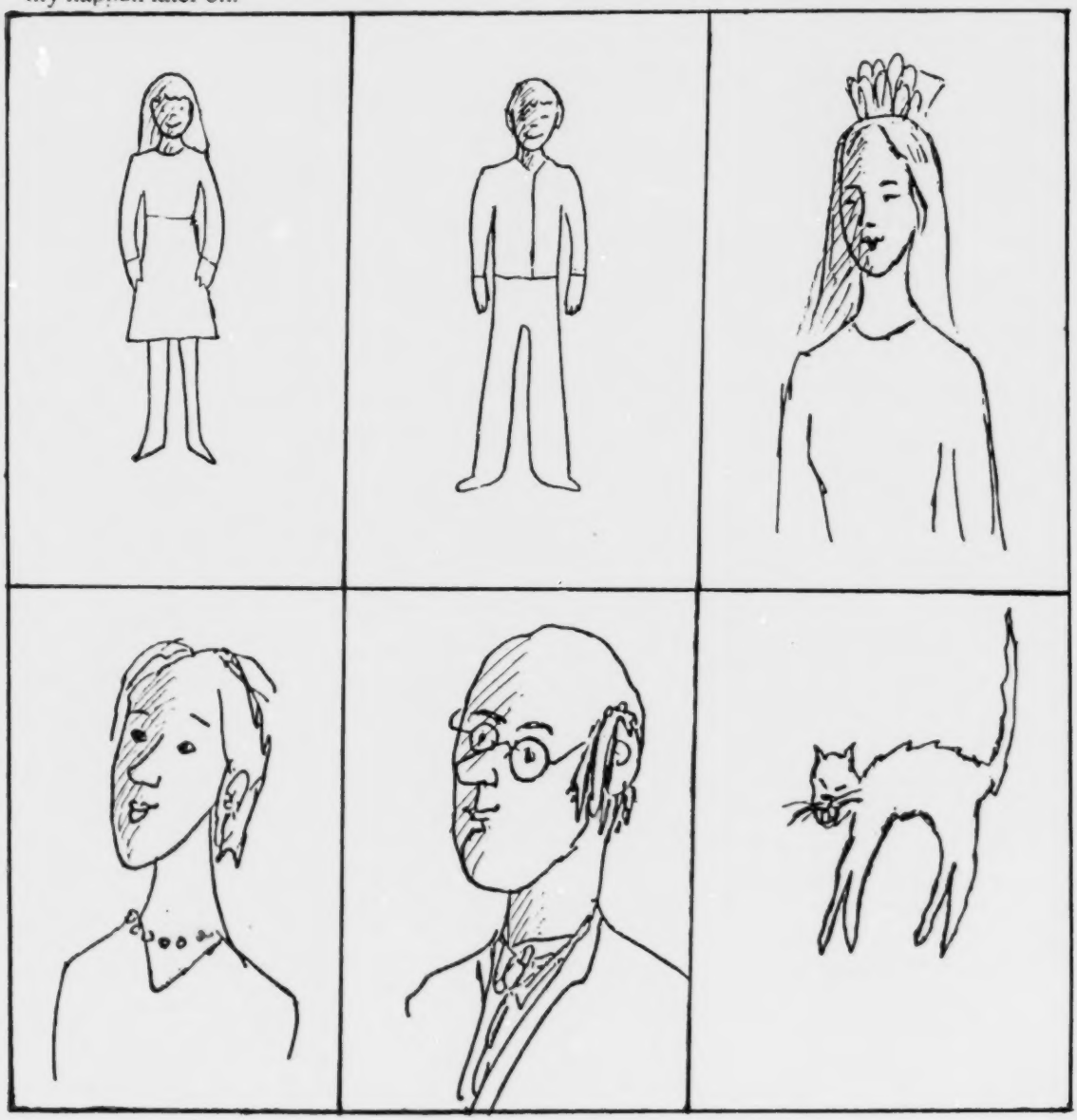
Drawing What You Imagine

Form A, Silver Drawing test

Choose two picture ideas and imagine a story - something happening between the pictures your choose.

When you are ready, draw a picture of what you imagine. Show what is happening in your drawing. You can make changes and draw other things too.

When you finish drawing, write a title or story. Tell what is happening and what my happen later on.



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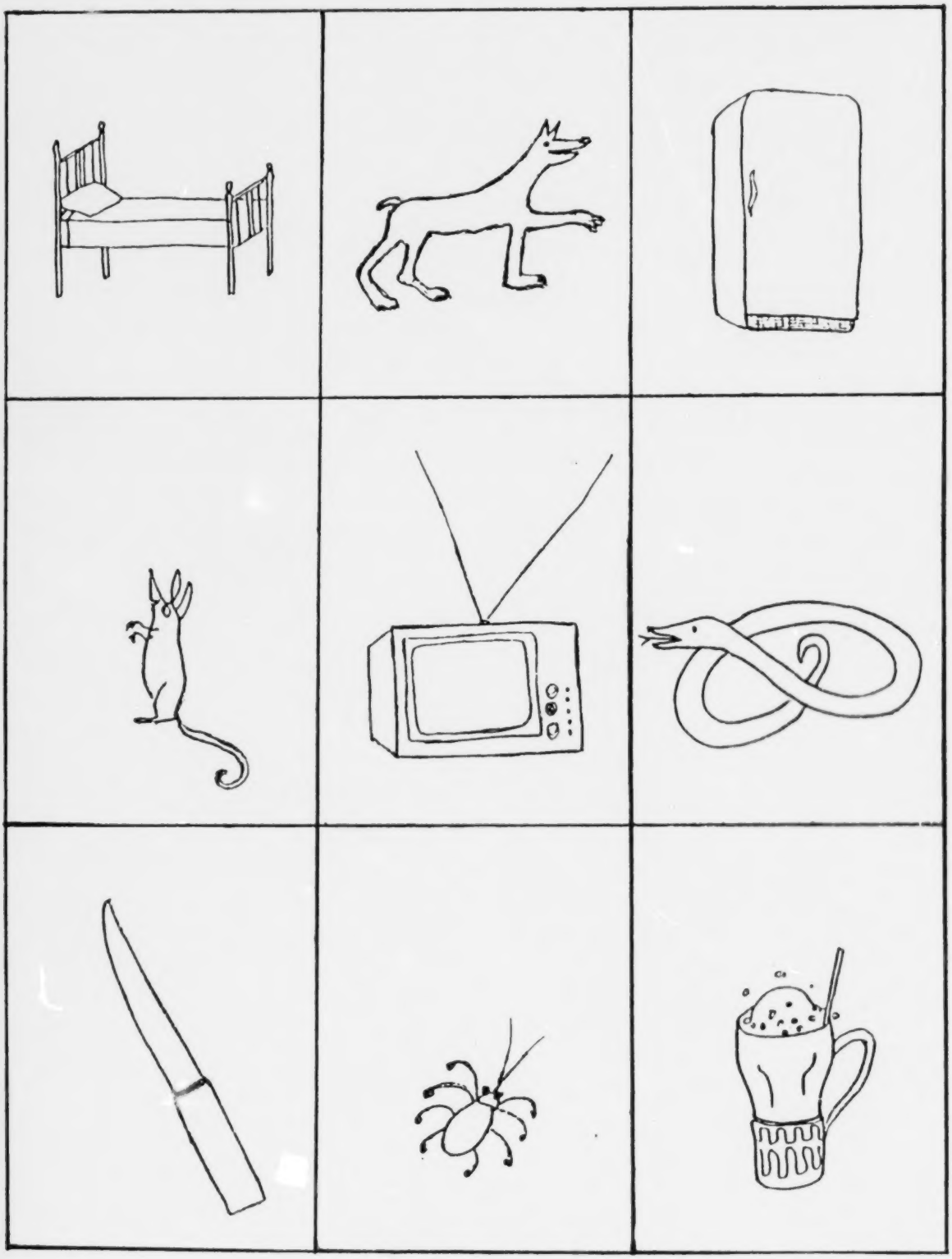

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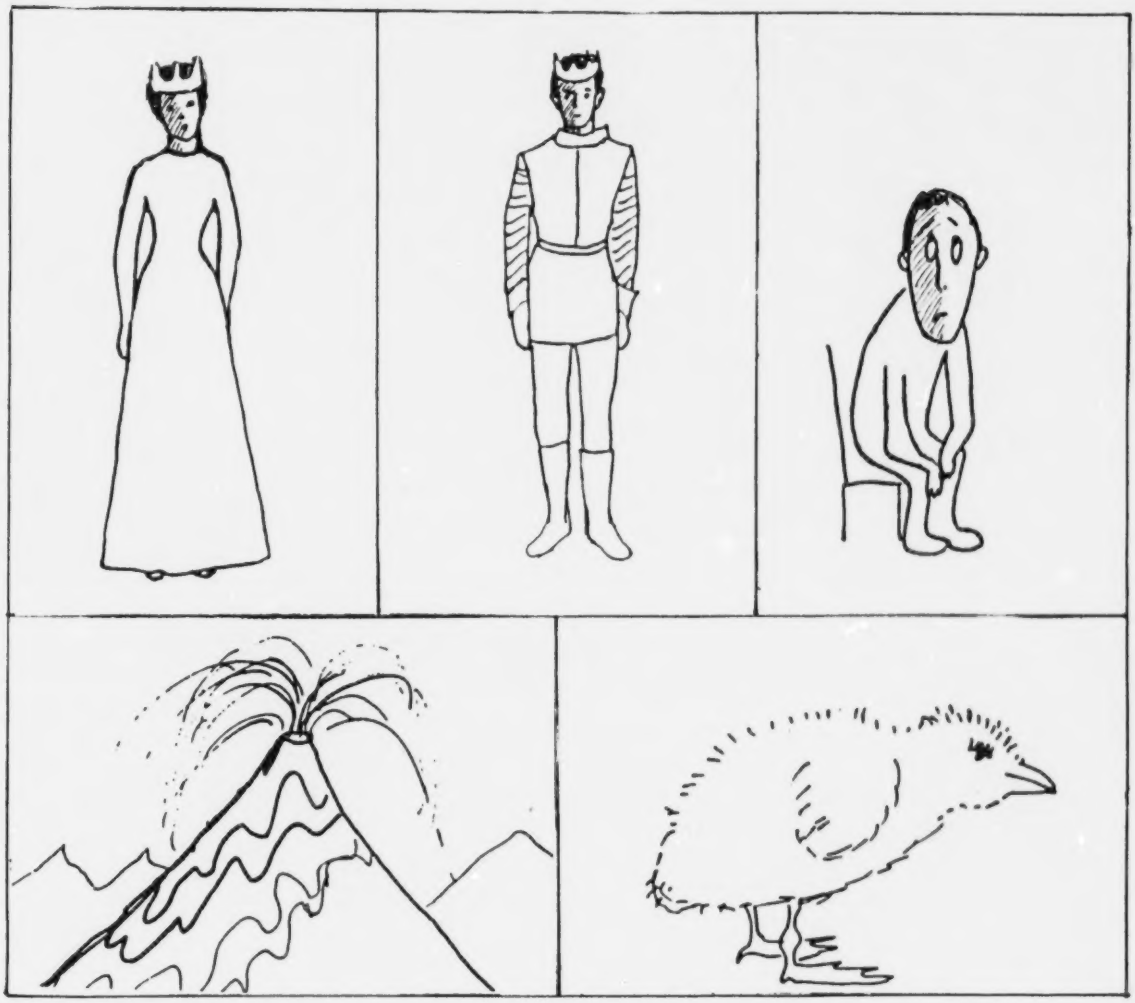
Drawing What You Imagine

Form B, Silver Drawing test

Choose two picture ideas and imagine a story- something happening between the p[ictures you choose.

When you are ready, draw a picture of what you imagine. Show what is happening in your drawing. You can make changes and draw other things too.

When you finish drawing, write a title or story. Tell what is happening and what may happen later on.



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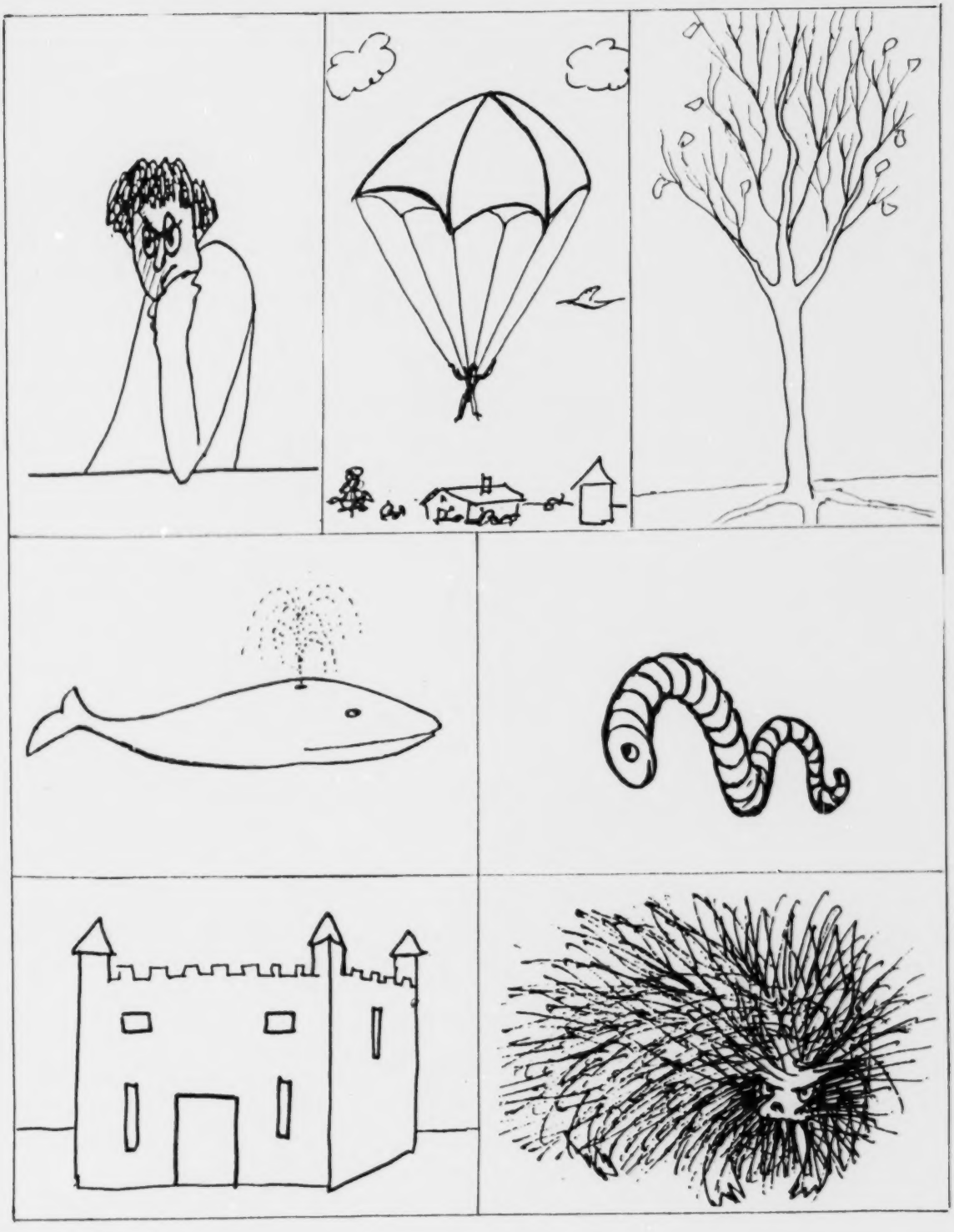

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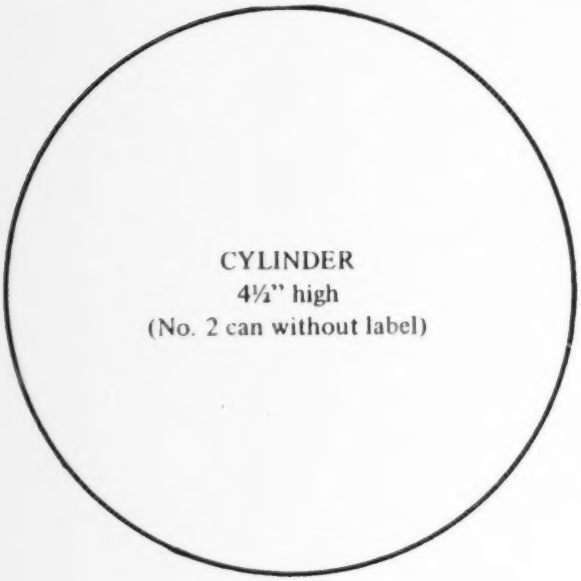
Silver Drawing Test Layout Sheet



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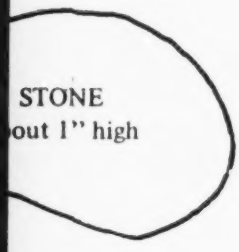

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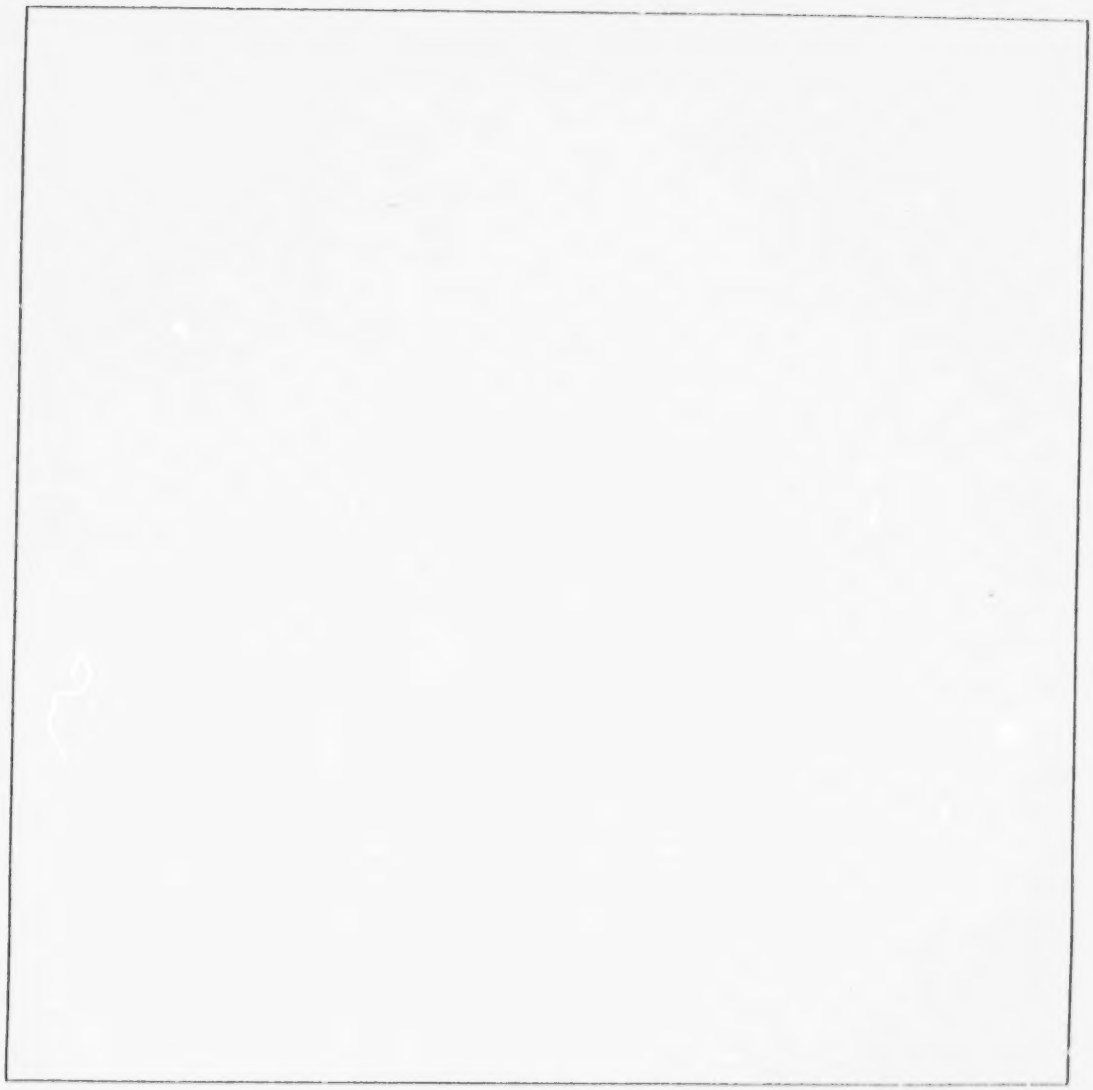
SDT Drawing from Imagination



Drawing

Story:_____

_____

_____

_____

_____

Please fill in the blanks below:

First name ____ Sex____ Age ____ Location (state): _____Date:_____

Just now I'm feeling ____very happy ____O.K. ____angry ____frightened ____sad

My drawings may be used for research purposes ___yes ___no.

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Silver Drawing Test

SDT INDIVIDUAL RECORD SHEET

Name: _____ Age: _____ Sex: _____ Date of Test: _____

School or institution: _____

City: _____ State/Prov: _____

Administered by: _____ Scored by: _____

Predictive Drawing

Sequence _____
Horizontality _____
Verticality _____

Subtest Total _____ Rank _____

Drawing from Observation

Left-Right _____
Above-Below _____
Front-Back _____

Subtest Total _____ Rank _____

Drawing from Imagination

Select _____
Combine _____
Represent _____

Subtest Total _____ Rank _____

Total Test Score _____ Rank _____

Emotional Content _____ Score _____ Theme _____

Title: _____

_____

Notes: _____

_____

Recommendation: _____

_____

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Date _____
Institution _____
Administered by _____
Scored by _____
Grade _____ Comment _____

	Predictive Drawing						Drawing from Observation						Drawing from Imagination									
	Sequencing	Horizontality	Verticality	Subtest Total	Rank *		Left-Right	Above-Below	Front-Back	Subtest Total	Rank *		Select	Combine	Represent	Subtest Total	Rank *		Total Test Score	Rank *		Projection	Other Test Scores
1.																							
2.																							
3.																							
4.																							
5.																							
6.																							
7.																							
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19.																							
20.																							
21.																							
22.																							
23.																							
24.																							
25.																							

* chose either percentile, average/above/below, or t-score

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SDT Classroom Record Sheet

Appendix B: Normative Data

Table 22. *Normative Data Based on Mean Scores of Samples of 624 Children and Adults*

Grade	Age	N	Mean Sc Pred. Dr	Mean Sc Dr. fr Obs	Mean Sc Dr. fr Imag	Mean Sc Total Score
1	6-7	22	4.82	6.27	7.55	18.91
2	7-8	82	7.92	8.05	8.41	24.38
3	8-9	127	8.51	9.02	8.78	26.81
4	9-10	106	8.54	8.36	10.01	26.91
5	10-11	66	9.32	9.42	9.24	27.98
6	11-12	27	8.87	10.27	10.08	29.22
7	12-13	26	9.88	10.04	11.47	31.39
8	13-14	39	11.74	12.32	11.01	35.07
10	15	16	12.06	11.31	10.56	33.93
12	17-18	36	10.97	10.22	10.42	31.61
Adults		77	12.87	14.18	12.29	39.58

TABLE: 23. *Percentile Ranks and T-Score Conversions for Predictive Drawing*

Grade	1		2		3		4		5	
Age	6-7		7-8		8-9		9-10		10-11	
Score	*t*	%ile	*t*	%ile	*t*	%ile	*t*	%ile	*t*	%ile
1	36.26	4	24.67	1	22.10	1–				
2	36.91	10	28.67	2	25.86	1	24.00	1–		
3	41.55	15	32.67	4	29.63	2	27.86	1		
4	46.20	35	36.67	9	33.40	5	31.72	3	24.90	1
5	50.84	53	40.67	18	37.16	10	35.58	7	29.46	2
6	55.49	71	44.67	30	40.93	18	39.44	14	34.02	5
7	60.14	84	48.67	45	44.70	30	43.30	25	38.57	13
8	64.78	93	52.68	61	48.46	44	47.16	39	43.13	25
9	69.43	97	56.68	75	52.23	59	51.02	54	47.69	41
10	74.08	99+	60.69	86	56.00	73	54.88	69	52.24	59
11			64.69	93	59.76	84	58.74	81	56.80	75
12			68.69	97	63.53	91	62.60	90	61.36	87
13			72.69	99+	67.30	96	66.46	95	65.91	94
14					71.06	98	70.32	98	70.47	98
15					74.83	99+	74.18	99+	75.03	99+
Grade:	6		7		8		10		adult	
1										
2										
3	21.19	1–					22.18	1–		
4	26.09	1	20.38	1–			25.47	1		
5	30.98	3	25.41	1			28.77	2		
6	35.87	8	30.44	2	23.76	1–	32.07	4	23.82	1–
7	40.76	18	35.48	7	28.52	2	35.37	7	27.82	1
8	45.65	33	40.51	17	33.27	5	38.66	13	31.82	3
9	50.54	52	45.55	33	38.02	12	41.96	21	35.81	8
10	55.43	71	50.58	52	42.76	24	45.26	32	39.81	15
11	60.33	85	55.61	71	47.53	40	48.56	44	43.81	27
12	65.22	94	60.65	86	52.28	59	51.85	58	47.80	41
13	70.10	98	70.72	98	57.03	76	55.15	70	51.80	57
14	75.00	99+	75.75	99+	61.79	88	58.45	80	55.80	72
15					66.54	95	61.75	88	59.80	84

TABLE 24. *Percentile Rank and T-Score Conversions for Drawing from Observation*

Grade	1		2		3		4		5	
Age	6-7		7-8		8-9		9-10		10-11	
Score	*t*	%ile	*t*	%ile	*t*	%ile	*t*	%ile	*t*	%ile
1	28.84	2	29.83	2	22.32	1–	28.51	2		
2	32.85	4	32.88	4	25.78	1	31.60	3		
3	36.86	10	35.94	8	29.24	2	34.69	6	23.76	1–
4	40.87	18	38.99	14	32.70	4	37.78	11	27.88	1
5	44.89	30	42.05	21	36.16	8	40.87	18	32.00	4
6	48.91	46	45.11	31	39.62	15	43.96	27	36.12	8
7	52.92	61	51.22	55	43.08	25	47.05	38	40.24	16
8	56.93	75	54.27	67	46.54	36	50.15	51	44.36	29
9	60.95	86	57.33	77	50.00	50	53.24	63	48.48	44
10	64.96	93	60.38	85	53.46	64	56.33	74	52.60	60
11	68.97	97	63.44	91	56.92	75	59.42	83	56.72	75
12	72.99	99+	66.49	95	60.38	85	62.51	89	60.84	86
13			69.55	98	63.84	92	65.60	94	64.96	93
14			72.60	99+	67.30	96	68.69	97	69.08	97
15					70.76	98	71.78	99+	73.20	99+

Grade:	6		7		8		10		adult	
Score	*t*	%ile	*t*	%ile	*t*	%ile	*t*	%ile	*t*	%ile
1	24.53	1–					34.57	6		
2	27.52	1					36.51	9		
3	30.51	3	23.68	1–			38.46	13		
4	33.50	5	27.47	1			40.40	17		
5	36.49	9	31.25	3			42.35	22		
6	39.48	15	35.03	7			44.29	28		
7	42.47	23	38.81	13	23.32	1–	46.23	35		
8	45.46	33	42.59	23	28.41	2	48.18	43		
9	48.45	44	46.37	36	33.50	5	50.12	50		
10	51.44	56	50.15	51	38.59	13	52.07	58		
11	54.43	67	53.93	65	43.69	26	54.01	66	17.79	1–
12	57.42	77	57.71	78	48.78	45	55.95	73	27.40	1
13	60.41	85	61.49	87	53.87	65	57.95	79	37.02	10
14	63.40	91	65.27	94	58.96	82	59.84	84	46.63	37
15	66.39	95	69.05	97	64.05	92	61.79	88	56.25	74

TABLE 25. *Percentile Rank and T-Score Conversions for Drawing from Imagination*

Grade	1		2		3		4		5	
Age	6-7		7-8		8-9		9-10		10-11	
Score	*t*	%ile	*t*	%ile	*t*	%ile	*t*	%ile	*t*	%ile
1										
2	24.79	1	23.36	1–						
3	29.30	2	27.38	1	24.20	1	22.35	1–	22.23	1–
4	33.81	5	31.40	3	28.79	2	26.39	1	26.66	1
5	38.32	12	35.41	7	33.38	5	30.43	2	31.08	3
6	42.83	24	39.43	14	37.97	12	34.48	6	35.50	7
7	47.34	39	43.45	25	42.56	23	38.52	13	39.93	16
8	51.84	57	47.46	40	47.15	39	42.56	23	44.35	28
9	56.35	74	51.48	56	51.74	57	46.61	37	48.77	45
10	60.86	86	55.50	71	56.33	74	50.65	53	53.20	63
11	65.37	94	59.52	83	60.92	86	54.69	68	57.62	78
12	69.88	98	63.53	91	65.51	94	58.74	81	62.05	89
13	74.38	99+	67.55	96	70.10	98	62.78	90	66.47	95
14			71.57	98	74.69	99+	66.82	95	70.89	98
15			75.59	99+			70.86	98	75.32	99+

Grade:	6		7		8		10		adult	
1										
2										
3										
4			21.75	1–			24.36	1–		
5	23.84	1–	25.54	1	21.80	1–	27.66	1		
6	29.00	2	29.33	2	26.29	1	30.97	3		
7	34.15	6	33.11	5	30.78	3	34.28	6	23.03	1–
8	39.31	14	36.90	10	35.27	7	37.59	11	27.93	1
9	44.46	29	40.68	18	39.76	15	40.90	18	32.84	4
10	49.62	48	44.47	29	44.25	28	44.21	28	37.74	11
11	54.77	68	48.25	43	48.74	44	47.52	40	42.64	23
12	59.93	84	52.04	58	53.23	63	50.83	53	47.55	40
13	65.08	93	55.82	72	57.72	78	54.14	66	52.45	60
14	70.23	98	59.61	83	62.21	89	57.45	77	57.36	77
15	75.39	99+	63.39	91	66.70	95	60.75	86	62.26	89

TABLE 26. *Percentile Rank and T-Score Conversions for SDT Total Scores*

Grade	1		2		3		4		5	
Age	6-7		7-8		8-9		9-10		10-11	
Score	*t*	%ile	*t*	%ile	*t*	%ile	*t*	%ile	*t*	%ile
8	22.69	1–	22.80	1–						
9	25.24	1	24.55	1						
10	27.80	1	26.30	1						
11	30.36	3	28.05	1						
12	32.92	4	29.80	2			23.05	1–		
13	35.47	7	31.54	3	22.81	1–	24.90	1		
14	38.03	12	33.29	5	24.90	1	26.76	1		
15	40.59	17	35.04	7	26.99	1	28.62	2	22.82	1–
16	43.15	25	36.79	9	29.07	2	30.47	3	24.88	1
17	45.70	33	38.54	13	31.16	3	32.33	4	26.95	1
18	48.26	43	40.29	17	33.25	5	34.18	6	29.02	2
19	50.82	53	42.04	21	35.33	7	36.04	9	31.08	3
20	55.38	71	43.79	27	37.42	10	37.90	12	33.15	5
21	55.93	72	45.53	33	39.51	15	39.75	15	35.22	7
22	58.49	80	47.28	39	41.59	20	41.61	20	37.28	10
23	61.05	87	49.03	46	43.68	26	43.47	26	39.35	14
24	63.61	91	50.78	53	45.77	34	45.32	32	41.42	19
25	66.16	95	52.53	60	47.85	41	47.18	39	43.48	26
26	68.72	97	54.28	67	49.94	50	49.04	46	45.55	33
27	71.28	98	56.03	73	52.03	58	50.89	54	47.62	41
28	73.84	99	57.78	78	54.11	66	52.75	61	49.68	49
29	76.39	99+	59.52	83	56.20	73	54.61	68	51.75	57
30			61.27	87	58.29	80	56.46	74	53.82	65
31			63.02	90	60.37	85	58.32	80	55.88	72
32			64.77	93	62.46	89	60.18	85	57.95	79
33			66.52	95	64.54	93	62.03	88	60.02	84
34			68.27	97	66.63	95	63.89	91	62.08	89
35			70.02	98	68.72	97	65.75	94	64.15	92
36			71.77	99	70.80	98	67.60	96	66.22	95
37			73.51	99	72.89	99	69.46	97	68.28	97
38			75.26	99	74.98	99	71.31	98	70.35	98
39			77.01	99+	77.06	99+	73.17	99	72.42	99
40							75.03	99	74.48	99
41							76.88	99+	76.55	99+
42										
43										
44										
45										

Note: The *t*-scores are based on the unbiased estimate standard deviation. Percentile ranks are calculated from the table of cumulative normal probabilities, *Biometrika Tables for Statistics*, vol. 1, edited by E. S. Pearson and H.O. Hartley, and assume the scores are normally distributed. These procedures were used to avoid underestimating variability, since, for several grades, the population is small.–Beatrice J. Krauss.

Grade:	6		7		8		10		adult	
Score	*t*	%ile	*t*	%ile	*t*	%ile	*t*	%ile	*t*	%ile
8										
9										
10										
11										
12										
13										
14										
15							26.49	1		
16							27.86	1		
17							29.23	2		
18	24.94	1					30.61	3		
19	27.33	1	26.96	1			31.98	4		
20	29.72	2	28.83	2			31.35	5		
21	32.11	4	30.71	3			34.73	6		
22	34.50	6	32.58	4			36.10	8		
23	36.89	10	34.45	6	24.96	1	37.47	11		
24	39.28	14	36.32	9	27.04	1	38.84	13		
25	41.68	20	38.19	12	29.12	2	40.22	16		
26	44.07	28	40.07	16	31.20	3	41.59	20		
27	46.46	36	41.94	21	33.28	5	42.96	24		
28	48.85	45	43.81	27	35.36	7	44.34	28		
29	51.24	55	45.68	33	37.44	10	45.71	33		
30	53.63	64	47.55	40	39.52	15	47.08	39		
31	56.02	73	49.42	48	41.60	20	48.46	44	27.50	1
32	58.41	80	51.30	55	43.68	26	49.83	50	30.18	2
33	60.80	86	53.17	63	45.76	34	51.20	55	32.86	4
34	63.20	91	55.04	69	47.84	41	52.57	60	35.54	7
35	65.59	94	56.91	75	49.92	50	53.95	66	38.21	12
36	67.98	96	58.78	81	52.00	58	55.32	70	40.89	18
37	70.37	98	60.65	86	54.08	66	56.69	75	43.57	26
38	72.76	99	62.53	89	56.16	73	58.07	79	46.25	35
39	75.15	99+	64.40	93	58.24	79	59.44	83	48.93	46
40			66.27	95	60.31	85	60.81	86	51.61	56
41			68.14	96	62.39	89	62.19	89	54.29	67
42			70.01	98	64.47	93	63.56	91	56.96	76
43			71.89	99	66.55	95	64.93	93	59.64	83
44			73.76	99	68.63	97	66.30	95	62.32	84
45			75.63	99+	70.71	98+	67.68	96+	65.00	93+

Appendix C

Developmental Techniques
National Institute of Education Project #79 0081

Class # 1: DRAWING FROM IMAGINATION

Materials: pencils, pens, paper 9x12, stimulus cards group A (people), Group B (animals), Group C (objects)

Objectives	Procedures
1. Improve ability to associate and form groups on the basis of class or function by	asking students to select images, combine them in a drawing, then represent their associations, at first nonverbally, by making the drawing tell a story, then verbally by telling the story or giving it a title.
a. focus attention on associations by	setting limits on subject matter, art materials, and talking, avoiding distractions and interruptions, and presenting and demonstrating the following task
b. elicit associative thinking by	presenting stimulus cards in three groups, asking students to select two cards from different groups, and draw a picture about the subjects selected. Demonstrate by selecting the lion and the boy climbing, then quickly sketch the lion awaiting the boy at the top and ask students to select other cards (but not copy them).
c. reinforce associative thinking by	providing kinetic as well as visual activities, time for quiet reflection while drawing, then solociting verbal associations by asking what is happening in the drawings. Introducing instructional "game" # 1.
2. Develop visual articulation and expressiveness by	emphasizing communication through narrative drawing, content rather than form
3. Develop creative abilities by	showing appreciation of originality and expressiveness, keeping task open ended, providing challenging experience
4. Build self-confidence by	emphasizing strengths rather than weaknesses, avoiding incidents that might cause anxiety or embarrassment
5. Assess ability at the outset and obtain clues to interests and perceptions of self and others by	scoring first drawings on 1-5 scale (see text), recording observations in activity log and notes, photographing or xeroxing key drawings, dating and numbering all (signed) drawings
6. set the stage for transfer by	making the art experience so rewarding that students will be tempted to use what they learn in their own ways for their own purposes in other situations.

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Class # 2: PAINTING

Materials: paper palettes, palette knives, red, blue, yellow, white poster paint, water, paper towels, paper 9x12 and 12x18, scissors or straightedges.

Objectives	Procedures
1. develop ability to order sequentially by	asking students to mix sequences of colors
a. focus attention on sequencing by	setting limits on colors, art materials, and talking; avoiding distractions and interruptions; and demonstrating how to mix a series of blue tints.
b. elicit sequential thinking by	asking students to put a dab of white on the right corner of their palettes, blue on the upper left, then mix a series of tints between them by adding more and more white to tints of blue. Next, add a dab of red to the lower right corner, and after sequencing a series of pinks and purples, add yellow to the lower left corner, mixing greens and oranges. Whether or not a student succeeds in sequencing, limit the time for this task to about 10 minutes. The rest of the time is spent painting spontaneously, either inventing colors and shapes or painting pictures.
c. reinforce sequential thinking by	providing kinetic as well as visual activities, time for quiet reflection while working and, toward the end of the period, discussion. Introduce instructional "games" #2 and/or 3.
2. invite exploratory learning and associative thinking by	asking students to find out for themselves what leads to what and asking them to select and combine
3. develop painting skills, intensify discrimination of color nuances by	emphasizing form rather than content
4. develop creative abilities by	showing appreciation of explorations and discoveries
5. build self-confidence by	keeping task time short, undirected time long; avoiding anxiety and frustration, showing appreciation of effort
6. assess ability to sequence at the outset by	completing activity log, photographing key paintings, dating and numbering all (signed) paintings
7. set the stage for transfer by	making the art experience so rewarding that students will spontaneously use what they learn in their own ways for their own purposes in other situations.

Class # 3: DRAWING AND PAINTING FROM IMAGINATION

Materials: stimulus cards Group D (places) and art materials of choice

Objectives	Procedures
1. improve ability to form concepts by	asking students to draw or paint images in space
a. focus on spatial associations by	setting limits on spatial associations and avoiding distractions and interruptions
b. expand awareness of objects in space and elicit associations by	holding up 1 stimulus card at a time and ask, "have you ever been to the beach? a farm? etc. What is it like? Ask students then to draw or paint a picture that shows where the story takes place (their own places rather than the cards).
c. reinforce associative thinking by	providing kinetic and visual activities, time for quiet reflection, and time toward the end of the art period for group disucssions and display of the work of each student, including titles.
2. develop visual articulation and paintings skills by	showing appreciation of both form and content
3. develop creative abilities by	showing appreciation of originality, expressiveness, inventiveness, elaboration, sensitivity, and above all, the subjective qualities in each student's work.
4. build self confidence by	showing appreciation of each students strong points. establishing atmosphere in which it is safe to practice "watched only by friends", protecting each student's dignity and freedom.
5. assess each student's progress and needs (after student have gone) by	dating and numbering work by each student and comparing with his or her previous work, include these observations in activity log; photograph and score key work
6. set the stage for transfer by	making the art experience so rewarding that students will spontaneously use what they learn for their own purposes in their own ways in situations elsewhere

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Class # 4: DRAWING FROM OBSERVATION

N.I.E. G 79 0081
2/80

Materials: an orange, apple, and blue cylinder (differing in size from the test cylinders); paper 8½x11" to serve as a base for the arrangement; toy house and animals; felt pens in orange, blue, green, red, craypas.

Objectives	Procedures
1. develop ability to perceive and represent concepts of space by	asking students to draw the orange and cylinder placed on the base (the orange to the left and about 1 inch forward) in the center of a large table or center of the room, below eye level.
a. focus attention on spatial relationships by	limiting subjects to two simple shapes and limiting art materials
b. elicit spatial thinking by	asking students to draw the arrangement then change seats with classmates so that the objects are seen in reverse, then from other positions. After these drawings, add the apple placed further forward than the other objects
c. reinforce spatial thinking by	asking students to set up toy landscape arrangement and draw or paint from observation (choosing their art materials and size of paper). Finally, discussion.
2. invite exploratory learning by	not pointing out mistakes or trying to prevent mistakes but directing attention with comments such as, "is that the way you want it? Are you sure?"
	Be alert for frustration, however, and demonstrate sketching as needed. For a student who has much difficulty, place his/her hand over yours as you draw, then take turns. When interests flag, ask for family portraits. Follow landscape house with "show who lives in your house with you".
3. build self confidence by	showing appreciation when student discover mistakes or persist or improve; present the task as a challenging game rather than an obligation; emphasizing rewards and strengths
4. assess each student's needs by	including observations in activity log, dating and numbering each drawing, photographing or zeroxing key drawings
5. set the stage for transfer by	making the experience so rewarding that students will spontaneously use learning elsewhere for their own purposes

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Class # 5: PREDICTIVE DRAWING OR PAINTING

Materials: toy boat (½bottle cork, toothpick mast, wire sail, plasticene keel); 8" glass jar filled with enough blue-tinted water to float the boat; plumbline (string weighted with a lump of clay) suspended for a stick: art materials of choice

Objectives	Procedures
visualize, and horizontal and vertical concept by	by asking students to predict changes in appearance, then test out predictions and draw them
a. focus attention on horizontalality by	asking, "what will happen to the boat if we tilt the jar?" Ask them to sketch their predictions. then take turns tilting the jar held above eye level. Then prop the jar on a lump of clay so that the water surface is parallel to table surface, and ask students to draw from observation. Do not correct mistakes.
b. focus attention on verticality by	asking students to guess how the "fishing line" would look when the pole is tilted in various positions, then take turns suspending the string next to a vertical object such as a door frame. The vertical parallels should be clearly visible as the stick is moved up and down. Again, do not mention this or point out mistakes.
c. elicit thinking and reinforce by	asking students to draw or paint a picture of someone fishing
2. invite exploratory learning and transfer by	asking students to find answers for themselves. Answer questions with, "what do you think?" or "is something wrong?" Limit manipulations to a few minutes, leaving most of the time free for reflection without interruptions or distractions.
3. build self-confidence and creativity by	showing appreciation of personal involvement regardless of ability to learn the concepts
4. assess ability by	recording observations and photographing or xeroxing key drawings or paintings, dating and numbering all drawings or paintings

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Rawley Silver is the author of more than 50 journal articles, research reports, and other publications in the field of art therapy. She received the Honorary Life Membership award from the American Art Therapy Association in 1983, and its annual award for research in 1975, 1980, and 1992. She is also an Honorary Life Member of the Art Therapy Association of Florida and a painter listed in Who's Who in American Art.

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